



Chance Reflections

Volume 1
c.1500–1836

The History, Glass, and Technologies of
Chance Brothers & Associated Companies

by David P. Encill

Foreword by Dr Malcolm Dick, OBE



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Published in the United Kingdom by:

Cortex Design

Bromsgrove

Worcestershire

www.cortex-design.co.uk



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Contents

Foreword, by Dr Malcolm Dick, OBE. . .	iii
Preface: The Infinite Uses of Glass	v
Introduction.	vi
The Trials and Tribulations.	vi
Weaponised	vii
Notes about this Book	viii
About this Volume (1 st of 10).	viii
Remembering	viii
Bite-Size Chunks	viii
Monsieur?.	viii
Endnotes	viii
Currency Conversions.	ix

Section 1

1. Establishing a Dynasty, c.1500–1822.	12
The First Iron Factors.	14
Birmingham & Bristol	14
Chance & Homer, Newhall Street.	15
2. Early Glassmaking	16
Crown Glass.	16
Cast Glass.	17
Stanton Wick Glassworks, 1787	18
Nailsea Glassworks, 1788	21
Robert Lucas Chance	22
Friggers and Foreigners	23
William Chance V, Early Years.	25
John Hartley.	25
3. A Break from Nailsea	26
Smethwick: Growth of Industry	27
Boundary Changes	28
The Evolution of Smethwick	28
Spon Lane	29
4. British Crown Glass Co., 1814–1822.	30
The Old Hall, 1815–1919.	33
Chance Iron Factors, 1818–1823	34
Nailsea Glassworks, 1821	34



Section 2

5. British Crown Glass Co., 1822–1834.	38
The Finances, 1822–1846.	38
Taxes & Duties	39
The Essential Ingredients for Glassmaking	40
Glassmakers' Initiation: Prince Rupert's Drop	42
R L Chance & Company, 1822–1828	43
Nailsea, 1825–1828	43
Transport Networks.	44
Land Acquisitions, 1828–1838	47
Missing Bills, 1827	48
John Hartley, 1828	48
Antoine-François-Jean Claudet	49
Georges Bontemps	50
Augustin-Jean Fresnel	51
Smethwick, 1831	52
The Iron Factors, 1820–1828	53
Messrs. Chance & Son, Factors	53
Chance's US Agent.	53
6. Financial Problems, 1831–1833.	54
John Badams	55
7. William Chance & the Riots.	58
Street Lighting.	59
From Constable to High Bailiff	59
The General Political Union	60
The Duke of Wellington's Visit	60
8. The Importance of Sheet Glass.	62
The First Frenchmen	64
Annealing Glass	67
The German Workers	68
The Brilliance of Crown Glass.	68
European Trade	68
Rapid Expansion In The 1830s	70
Shades	71
Window Tax.	72
9. Taxes & Duties.	72
Excise Duty.	73
Drawbacks	74
The Level of Duty	74
Evading Duty	75
Penalties for Evasion	76
Excise Duty Inhibitions	76
Experimentation, 1835.	77
Plate Glass	77
Association of the Crown Glass Manufacturers	78
10. The Glass Trade	78
The London Office	79
Samuel Nicholls & Other Merchants.	79
Overseas Trade, 1829–1842.	80
William & George Chance	81
Muriatic Acid Nuisance.	82
Leblanc Process	82
11. The Alkali Works, 1834–1840	82
New Premises.	83
Failure and Expansion.	83
12. Chances & Hartleys, 1834–1836	84
Deterioration of the Partnership	85
Coloured & Ornamental Glass, 1834–1839	87
Birmingham Plate Glass Co.	88
Nailsea Sale	89
Who Was Lucas Chance?	89
Journals, Articles & Magazines	92
Bibliography	92
The Essential Ones	93
Others	93
Publications, General	94
Publications, Lighthouses	95
Appendix 1: Lucas Chance's Notes	96
Instructions to his Son, John Homer Chance	96
Remarks as to the Effect of taking off the Excise upon Glass	98
Appendix 2: Finances, 1823–1829	99
Appendix 3: Credits.	100
With Special Thanks to	100
Can You Credit It?.	100
Dr Johnson's Quote in Full	100
Acknowledgements	101
E&OE.	101
Index.	102



Dedicated to Patricia Coccoris, my
life partner, rock, and passionate critic



In memory of my parents,
Albany & Joan
who would have been proud

Foreword



Smethwick was originally a sparsely populated settlement, part of the Staffordshire parish of Harborne, but it grew rapidly in the eighteenth and nineteenth centuries into a globally significant manufacturing centre. Canals connected the township with Birmingham and the wider world and the Soho Foundry of Boulton and Watt became the first specialised unit for making steam engines.

Just as important – maybe more so – was the glassworks developed and expanded by the Chance family from the 1820s. The business grew rapidly, manufacturing plate glass for windows, stained glass, and lighthouse lenses across the world. Chance Brothers was most famous for showcasing early Victorian Britain in the Crystal Palace of 1851. The company made 293,655 panes of glass to sheath the vast exhibition space and its products, including a dramatic lighthouse lens featured amongst the exhibits.

In *Chance Reflections* volume 1, David Encill provides the first detailed chronology of Chance Brothers from 1822 to 1836, before the Crystal Palace turned the company into a household name. His well-researched, carefully structured, and beautifully illustrated narrative not only provides a record of the business in its crucial early years, but it contains much contextual and explanatory material.

We learn about the development of glass making and the early history of the Chance family and their engagement in glassmaking before the location of the family concern in Smethwick. Financial pressures may have collapsed the business, but entrepreneurial expertise and the introduction of glassmakers from France turned the business into an international company. The application of new technology created both plate glass and coloured and ornamental glass. Equally importantly we gain an insight into marketing, the impact of taxes and duties on glass and the activities of family members such as the restless innovator, Lucas Chance and his younger brother William Chance, who was involved in local politics and philanthropy. David Encill also explores the employment of workers, including the French employees and their checkered relationship with the company.

Recently, David Encill has published two marvellous guides for those who collect the twentieth-century household glass produced by the company:

1. *Chance Expressions: the History of Domestic Glassware from Chance Brothers*, and
2. *Chance Additions: the Sequel to Chance Expressions*

This new account, *Chance Reflections*, explores the wider history of Nailsea and Chance Brothers over nearly two-hundred years. It is scholarly, accessible, and wonderfully informative. I recommend it wholeheartedly to anyone who is interested in glass technology, business developments and local and regional heritage.

Dr Malcolm Dick, OBE





A painting from 1352 showing Hugo of Saint-Cher wearing spectacles. One of the earliest recordings of two lenses being used together to correct vision, as opposed to the use of a single lens magnifying glass.
[Painting by Tomaso di Modena, Wikidata](#)

Preface: The Infinite Uses of Glass



Writers aren't alchemists who transmute the human experience into aurous words. No, writers are glaziers, placing glass onto windows of stories that enable us to see inside. And if they are really good, we can see our own reflections staring back at us.

— Kamand Kojouri (with kind permission)

Expanding on the words of Dr Kamand Kojouri, the historical novelist and poet: take a long hard look through your window. What do you see? The sky, a garden, trees, a road, people, birds, cars? Precisely: you do not see the window, and your vision is virtually unimpaired by that single- (or double-, or even triple-) glazed window. This is what the Smethwick-based company of Chance Brothers continually strived to achieve for 159 years: glass that was perfectly clear and flat. Imagine our modern world without glass and it's something not many will contemplate.

To some people, the glass made by Chance Brothers is synonymous with inexpensive, highly decorated glassware and handkerchief vases made in a variety of shapes that could be seen in many households worldwide. Others will see the Company as simply Lighthouse manufacturers.

But to simply label it thus really does the company a gross injustice. *'If it could be made in glass, Chance made it'* is a phrase I often reiterate to demonstrate not only the versatility of glass, but also the sheer diversity of the company. Chance Brothers cast, blew, pressed, ground, polished and shaped glass in ways that few can imagine. From the thinnest microscope cover slips to massive lighthouse assemblies weighing several tons, and telescope discs manufactured from the largest single piece of optical glass – and everything in between.

From its inception in November 1822, when Robert Lucas Chance first melted glass at the Spon Lane site, Chance Brothers was an innovator of many production methods: the supplier of glass for some of the most amazing buildings in the world; the world's leading manufacturer of lighthouses and lens assemblies; innovators and inventors of new systems and processes; a producer of some of the most iconic domestic glassware.

As importantly, Chance Brothers was a vital supplier in both World Wars of optical glass to British and Commonwealth arms manufacturers that conceivably could have shortened, or even affected the outcome of both conflicts.

Chance Reflections reveals many historical aspects and facts that were previously unknown about one of the world's most important manufacturers of the Victorian era. In addition, all of the technologies, discoveries and inventions from Chance Brothers are explored. Many were highly significant developments that impacted heavily on the industrialised world, others were more obscure and quite remote from their glassmaking origins.

The sheer size and scale of the Chance Brothers' glassworks is also beyond most people's comprehension. Sometime around 1868 during an extended stay in Britain, the American reformist, Elihu Burritt, summarised the scope of glass production at Chance Brothers:

In no other establishment in the world can one get such a full idea of the infinite uses which glass is made to serve as in these immense works

Perhaps these words sum up, better than anything, the impact that Chance Brothers made on 19th-century Victorian England.

David P. Encill, Bromsgrove,
Worcestershire, UK, 2024

A № 2 cover slip, c.1950, balanced on the author's forefinger. These were first made in 1840.





Introduction

Anybody can have ideas—the difficulty is to express them without squandering a quire of paper on an idea that ought to be reduced to one glittering paragraph.

—Samuel Langhorne Clemens (Mark Twain)

THE TRIALS AND TRIBULATIONS

According to Clemens' quote (above) it appears that I did not succeed!

But ...

The research and writing of this book kept revealing all manner of information and diverse topics that were tantalising and difficult to ignore.

Even without the sheer scale of the task, writing this book was not without problems, but these were considerably alleviated by several sources.

One, a private publication written by the eminent researcher, James Frederick (J. F.) Chance, is the definitive work on Chance Brothers until 1919 (reprinted to 1926; 302pp) and without access to his work, this book would have rendered my work incredibly difficult, if not impossible. J. F. Chance, a former director at Chance Brothers, had unfettered access to the Chance archives during his research, including his dissemination of the minute books up to 1909 that are no longer available. So I make no apologies for leaning heavily on his research, but instead consider it a homage to his great work.

Sometime after the takeover by Pilkington Brothers in the early 1950s, the Chance Brothers' archives were transported to St Helens. The sheer quantity of material – about 30 cubic metres is staggering; imagine a room measuring 3.1m×3.1m×3.1m, rammed tight full of paperwork and ledgers – was, without cataloguing, virtually inaccessible to all intent. Thankfully, in 2009, Pilkingtons released much of the archives to Sandwell Library in Smethwick, Birmingham (blackcountryhistory.org), and this allowed research into the years up till 1948, with a few scatterings of research beyond that date. Even this task was monumental and I am grateful to Laura Brett for her early work in cataloguing a good proportion of the archives into a meaningful state.

Sadly, some of the material from the Archives was inexplicably missing – in total 23 years' worth – covering some of the most crucial parts in the history of the Company. Those volumes missing were the Board Minutes between 1948 and 1956 (covering the takeover by Pilkington in 1952) and 1969 to 1981 (halting rolled

plate production in 1976 and the eventual closure of the entire plant). This explains why some chapters of this book are full of detail, while others are less so. Thankfully, the Company's own in-house magazine *Chance Comments*, published between 1948 and 1963, went some way to papering over the cracks.

However, what became of these ledgers is mysterious and could be explained if they were removed by the Pilkington management due to the sensitive nature of the events mentioned above. It is believed that, following the takeover in late 1952, a certain amount of ill-feeling existed between the board of Pilkingtons and the Chance family.

The second reference book is *Mirror for Chance*, a company-produced book with marvellous photographs and illustrations, which was released in 1951. This date was just on the cusp of the release of Fiesta tableware, and the earliest photographs of this glassware were sourced from here. Although *Mirror for Chance* is a very difficult book to locate, it has since been reprinted by the Chance Heritage Trust ([see chanceht.org](http://chanceht.org)).

Lastly, Professor T. C. Barker, the Pilkington Brothers' historian, was responsible for many excellent books, and two of the main references used to research this book were *Pilkington Brothers and the Glass Industry* (295pp), written in 1960, and *The Glassmakers* (557pp) in 1976, the latter coinciding with Pilkington's 150th anniversary. Because of the closer alliance between Chances and Pilkingtons that started from about 1922, when Austin Pilkington became the first member of his family to enter the Chance Brothers' works, much can be gleaned from Prof Barker's works.

The liberal use of photographs was aided in particular by *Glass in Architecture & Decoration*, by Raymond McGrath and A. C. Frost. This behemoth of a book was published in 1937 by The Architectural Press and contains dozens of images and photographs that, although monochrome, form the great body of illustrations for the later volumes of *Chance Reflections*.

Surprisingly, the final section of Chance Brothers' history, the period from 1948 until its closure in 1981, was the hardest to research as apart from the minute books from 1958 to 1967, the paperwork is sporadic on either side of these dates, apart from the few scraps retrieved by the author from a mountain left behind in the derelict office building, just days before it was due to be demolished for some inexplicable reason – thankfully the demolition order was eventually rescinded.



In some cases, this work relies on the reminiscences of the workforce although, as can be appreciated after over forty years since the works closed, memories had dimmed somewhat. While the accuracy of this data is not wholly dependable, it can still be relied on to maintain more than just a vestige of truth. Therefore, I make no excuses for including this information as it provides valuable insights into the working conditions and values of the time.

WEAPONISED

A word on the researchers' three new weapons: computers, the internet and digital cameras. These have opened up new vistas of opportunity that otherwise remained firmly shut. Although my location from the Spon Lane site is a mere few miles, without the internet and the level of detail it offers, this book would never have been the same. Such internet resources as The Times Digital Archives, British Newspapers Online, Revolutionary Players, The Flightglobal Archive, Lighthouse Explorer, Grace's Guide, British History Online and European Patent Office, to name just a few, proved so useful it is hard to express this properly.

Even when travelling to such places as Broadfield House, Smethwick Heritage Centre or Smethwick Library, the ability to "snap" or scan pages of data in the blink of an eye takes away the hard slog of scribbling down snippets – and then not being able to interpret your own "Manglish"! How earlier researchers managed to accumulate the required data is very hard to appreciate: travelling to London meant at least one overnight stay and researchers had to be financially independent to afford such ventures. To a certain extent, the internet and digital cameras do make the researcher's life too darned easy.

Searching on the various internet sites, however, was not all rosy. It should be simple, one would think, to adopt a search term of "Chance Brothers" and everything clicked into place. Sadly not. Too often, the company was referred to variously in newspapers as Messrs Chance, Chance Bros., William Chance, and even Messrs. Robert Lucas Chance & Sons¹, meaning that vast databases had to be searched several times for each phrase. Additionally, there are a series of novels about two siblings who, unfortunately for the author, are named "The Chance Brothers" ... and let's not forget the eponymous card that goes with the Monopoly game. The accuracy of data from the internet was not always dependable and, in some part, the inevitable game of "Chinese Whispers" started – once one "truth" becomes established as "fact" it is then propagated throughout the 'net ad hoc and without any fact-checking.

Rule 1: Check your facts ...

Rule 2: See Rule 1

No matter: the growth of websites is rapidly taking us into a new era of information acquisition. Daily, new websites are being "spun" that offer yet more data on ever more diverse subjects. To quote Sir Francis Bacon in 1597, '*scientia potestas est*' (knowledge is power).

Finally, the stories and anecdotes of the men and women who worked at Chance Brothers complete the picture and while there is a certain amount of digression and meandering, I felt this was necessary to relate the complete story. These books are also heavily illustrated; after all, according to Lewis Carroll, '*What is the use of a book without pictures and conversations?*'

David P. Encill, Bromsgrove, Worcestershire, 2024



Notes about this Book

ABOUT THIS VOLUME (1ST OF 10)

This first volume is being offered entirely free to download with no strings attached, apart from it being protected with a watermark. It is expected for the entire work to number ten volumes in all. See chancebrothers.uk

This print copy differs only slightly from the downloadable PDF. The only significant difference is the inclusion of an index.

REMEMBERING ...

As a consequence of writing this book over such a long period, it is inevitable that a few people who helped contribute should pass on and who, sadly, never got to see the result:

David Bryant, MBE, the founder of Smethwick Heritage Centre Trust.

Professor Michael Cable, whose knowledge of Georges Bontemps and glass technology was imperious.

Sir Jeremy Chance, Bt, an ever-enthusiastic supporter.

Joan Encill, my mother, who provided unstinting and unselfish moral support for so many years.

Alan & Joyce Taylor, whose beloved lighthouses live on.

BITE-SIZE CHUNKS

Due to the immensity of this work, the adopted layout evolved over time until it reached the point where the usual conventions were thrown out of the window.

Each volume covers, chronologically, a period in time with endings that are logically divided at crucial periods in the Company's history.

Each "section" is a shorter period, varying in length, but not exceeding twenty years. For example, 1850 represents the end of a section, and a new section is then introduced from 1851 to cover the launch of the Lighthouse Department and the Crystal Palace, until 1867 when the Ornamental Department finally closed.

Each "chapter" is a year's worth of data that is subdivided into topics. This arrangement helps the reader locate pertinent information swiftly, without poring over long passages of text. The only exception to this is many of the individual Departments, such as the Lighthouse, Optical and Alkali Works, which have chapters of their own covering the period within each section.

ENDNOTES

Endnotes are used liberally throughout, but only as source references. They are extensive and can number up to 1,200 *per volume*, so moving them to the end of each section improves the flow of reading without the need to constantly check whether more pertinent information exists. (Spoiler alert: it doesn't.)

Endnote Abbreviations, with examples

BL	British Library
CA	Chance Additions
CC mm yyyy, p.12	Chance Comments, month year, page 12
CE	Chance Expressions
CHAS BS6/ ...	Community History & Archives Service (Sandwell Libraries) BS6=Chance Archive
CRL	Cadbury Research Library
HM	Harold Martin
JFC	A History of Chance Brothers & Co., James Frederick Chance
WHSC	History of Chance Brothers Ltd, 1920–1975, Hugh Chance, unpublished
SA	Sandwell Archives
TCB	The Glassmakers, T. C. Barker
TC/PW	Lighthouses: The Race to Illuminate the World, Toby Chance & Peter Williams

For clarification, some terms are used throughout the book to emphasise those relating just to Chance Brothers, such as Company, Firm, Directors, Furnace, House, etc.

Without getting bogged down in too much technical detail, the appendices manage this data, such as all the patents credited to Chance Brothers.

MONSIEUR?

To avoid confusion with the name initial M. and the abbreviation M for monsieur, I decided to create my own abbreviation: **Msr**

CURRENCY CONVERSIONS

By using the Bank of England's online "Inflation Calculator" (and others) it is possible to provide a comparable amount from, say, 1822 to 2023.² For example, £1 in 1840 would be worth £84 in 2023. This is written as follows: £1 [£80.63] – showing an inflationary rise of eighty times.

A very rough guide to the value of the British pound sterling (£) over the years, compared to 2023 is:

Year	Worth
1780	£148
1800	£69
1820	£80
1840	£84
1860	£100
1880	£99
1900	£101
1920	£36
1940	£46
1960	£19
1980	£4.11
2000	£1.82
2020	£1.22
2023	£1.00

For the twentieth century, one great tool is the Cost of Living website³ that offers a similar conversion to the Bank of England's, but with the advantage of using pounds, shillings and pence, and it has the added advantage of using house prices, car prices and wages as a guide to relative worth. So £220 bought an average house in 1900, but the annual average wage was a mere £58. An average car would have cost £200, while nowadays the cost of a car is roughly equivalent to the annual wage, while a house is about twelve times the annual wage (£300,000 or the cost of a new Ferrari).

A rare £100 bank note dating to 1938: an equivalent worth of about £3,800 in 2023
[Wikipedia.org](https://www.wikipedia.org)

Another invaluable online calculator is found at Historical Statistics.⁴ For the few instances where a foreign currency is used, such as the French franc or US dollar, this permitted comparable conversions of relative worth that could then be converted to the UK pound. Similarly, for direct conversion from the US dollar to the British pound, then the website Measuring Worth provides this capability.⁵ Naturally, using different sources will mean slight variances, but while this should not be too significant it is appreciated that the earlier data will cause the greater variance.

An interesting historical digression to the archaic currency that was in use until 1971, when decimalisation was introduced, is, as follows:

Pounds, shillings and pence were the basic currency of Britain ... having a consistent relationship of 12 pence to the shilling and 20 shillings to the pound. Values are generally expressed as £.s.d., or else l.s.d., as in £12 10s 6d or twelve pounds, ten shillings and sixpence. The pound sign stands for Libra, a pound weight in Latin, the s. is an abbreviation for shilling in English, and the d. stands for denarius or denarii (a Roman coin).

Going back further in history then the more archaic British currency is revealed:

... references to guineas, with a value of 21 shillings, marks (13 shillings, 4 pence), nobles (6 shillings, 8 pence [one-third of a pound]), crowns (5 shillings), half crowns (2 shillings, 6 pence); and coins worth 6 pence, 3 pence, 2 pence, halfpence and farthings (one quarter of a penny).

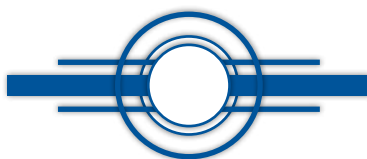
All courtesy of OldBaileyOnline.org

However, for the period of this book only pounds, shillings and pence are used, along with conversions to the current British pounds and pence.





SECTION 1



c.1500-1822



Establishing a Dynasty, c.1500–1822

*Who, when he saw the first sand and ashes,
by a casual intenseness of heat, melted into
a metalline form, rugged with excrescences,
and clouded with impurities, would have
imagined, that in this shapeless lump lay
concealed so many conveniences of life, as
would in time constitute a great part of the
happiness of the world*

— Samuel Johnson, Rambler Nº 9, 17th April 1750⁶

James Frederick Chance mentions in his book, *Chance of Bromsgrove and Birmingham*, of the difficulty researching family names and the variations that can often be found of totally unrelated people. For about three centuries the spelling of the family name has stabilised as Chance, but earlier occurrences also spelt the name as Chaunce and often with both variations in the same document. As the name is linked to the current spelling then the earliest occurrences in the variations are possibly Chawns (1352), Chauwnce (c.1500), Chawne and Chawse (c.1545).⁷

Although chaunce is an archaic word in English meaning chance, possible French derivatives could be Chauncy (Chancy) or Chauncey meaning “Chancellor”, thereby suggesting a Norman lineage, but these derivatives are disputed by Charles Bardsley (see below). Possibly fanciful (one could say “chancy”),⁸ but interesting nonetheless, is the mention of Chawnes and Chawns in the Battle Abbey Roll,⁹ although this itself is of doubtful pedigree having been compiled many years after 1066.

According to Bardsley, the Middle English word “chance” generally meant a “happy accident” or “good mishap”. In fact, Bardsley unearthed a very early finding of a Richard Chance, dating back to the reign of Edward I (1239–1307; reigned 1272–1307) in reference to a *Placita de Quo Warranto*;¹⁰ that is, a royal writ requiring the person to show proof of authority.¹¹

Richard Chance, co. Warw., 20 Edw.I.

Deciphering this to mean Richard Chance of the county of Warwickshire, aged 20(?) in the reign of Edward I. It is therefore notable that a Chance was already residing in Warwickshire, from where his descendants settled in and around the county.

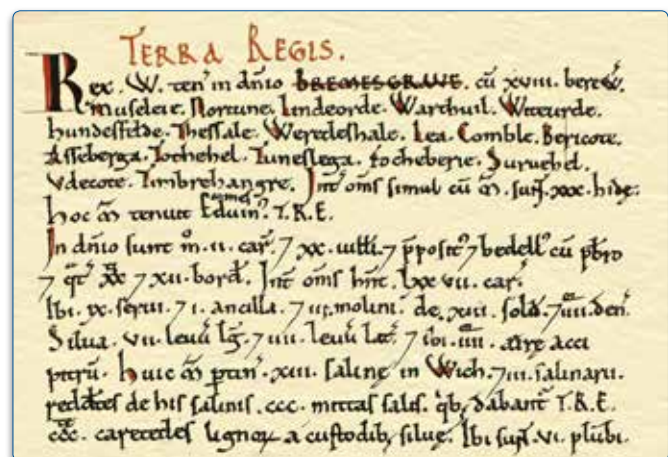
The problem with Bardsley’s theory is that the original phonetic pronunciation of the surname “Chance” or “Chaunce” is more akin to sounding like “Shawnce”.

This leads us to the earliest mentions of a possible descendant, Thomas Chawns of “de Catsulle” (Catshill, near Bromsgrove) who, in 1352, sold land in Fockbury,¹² Bromsgrove.¹³ At around this time, there were also two notable people with the Chaunce surname, John and Roger, both of whom were the Member of Parliament for Reigate, Surrey at separate times (fl. around 1363 and 1429 respectively, perhaps father and son or grandson), but again it is not known whether there is a familial link and it would be presumptuous to assume so.

In 2023 the Chance name was rated as the 13,002nd most common in the world, with approximately 43,000 people having the surname.²⁰

Moving forward two centuries, the Chance family line can be reliably traced back to a John Chance (d.1618) of Bromsgrove. The relevant lineage to this book, however, is several generations later, with William Chaunce (1660–1739), who married Elizabeth.

Bromsgrove is a market town in Worcestershire, mentioned in the Worcestershire Subsidy Rolls of 1523. “Bremesgrāve” (meaning “Bremi’s grove”) in 1086, when the Domesday Book was published, was a small hamlet with twenty villagers, 92 smallholders, nine slaves, one female slave, a priest and five others. It was predominantly a farming community and supported two lord’s plough teams and 77 men’s plough teams.¹⁴



Domesday Book extract for Bromsgrove

Courtesy of Professor J. J. N. Palmer and George Slater, opendomesday.org

Bromsgrove was surrounded by massive woodland measuring in area seven by four leagues (21 by 12 miles, or 252 sq. miles; 652 sq. km), with three mills valued at 13s 2d [very roughly £13,300] and thirteen salthouses.¹⁵ The salthouses were a mainstay of Bromsgrove industry.

The Bromsgrove area was so large that it actually dwarfed the tiny hamlet of “Bermingtha” (Birmingham) where the woodland measured a mere 0.375 sq. miles (1 sq. km) in area, but later become Britain’s second city.¹⁶

Apart from the Bromsgrove families, the name Chance, Chawnce or Chaunce can be found in the locality of other Worcestershire towns, such as Hadzor (Droitwich), Hob Lench (Ab Lench), Kidderminster, Harvington (Evesham),¹⁷ all of which are a short distance from Bromsgrove.

John Chaunce (I) who lived at Shepley in Bromsgrove, Worcestershire, is recorded as being a mason. He is thought to have been born around 1560 to 1570, with his will being dated 12th February 1617. He married Bennet, who was buried at Bromsgrove on 18th March 1634.¹⁸ Although the hamlet of Shepley no longer exists, a Lower Shepley Farm appears on the 1883 Ordnance Survey maps situated just north of Burcot, which is also mentioned in the Domesday Book. A Lower Shepley Lane (south of the farm site) is less than a mile north of Burcot.

John (I) and Bennet’s son William married Anne Butler on 18th July 1599. From this union, four children

were born: Benet, William, John and Mary. From here, John (I) had seven children with his first wife, six of whom appeared to have survived into adulthood. Of these, his eldest son, William Chaunce (I; 1659–1739), married Elizabeth, a “relict” (meaning the widow) of Wheeler Perkes of Fairford, Bromsgrove on 18th April 1656. William Chaunce (I), whose name later appears as Chance, was originally a yeoman farmer originating from Burcot in Bromsgrove, Worcestershire, farming in Shepley and Burcot, which are both about 12 miles south of Birmingham. From the Worcestershire Subsidy Roll of 1667, ten Chances were registered living in Bromsgrove.

William Chaunce’s (I) eldest son William (II) continued in the family farming business, while his second son John (II, 1687–1771), without any land bequeathed to him on his father’s death, chose to become a “cordwainer” working in cordovan leather; a kid goats’ or lambskin. Due to the soft and supple feel of the leather, John (II) made the highest quality footwear, dealing with exclusive patrons. It appears that John’s (II) business was prosperous as he employed apprentices as shown in the Register of Duties Paid for Apprentices’ Indentures.¹⁹

John’s (II) eldest son, also John (III; 1711–1750), continued the family business while his two other sons, William (III; 1713–1802) and Thomas (1721–1774), remained bachelors with each choosing entirely different professions, although interlinked.

Map of 1675 with relevant place names around Bromsgrove (shown in red)



THE FIRST IRON FACTORS

William (III) started work as a saddler (again, a leather worker), then later formed an iron factoring business. Thomas chose seafaring and ultimately became a captain. All three brothers became instrumental in the story of Chance Brothers in different ways.

John (III) married Hannah Hunt from a very wealthy Bromsgrove family, but she died three years later in childbirth at the age of 34, with both their daughters dying in infancy. Within eight months John (III) had married Mary Tilt (1721–1812) in 1746, and it is recorded that this marriage angered his devoutly Christian father (John II) leading to John (III) being disowned; whether this was due to the speed in which John remarried, or his choice of a new wife is not known. Although Mary Tilt was seemingly dealt with quite harshly by John (II), *‘it is probably to her in a great measure that the Chances of Birmingham owe their constitutional vigour’* according to J. F. Chance, living as she did for 91 years of age.

With his new wife, John (III) had a son William (IV, 1749–1828) and a daughter Sarah, but due to John’s early death in 1750 at only 38 years old, it was left to his brother, William (III), to bring up John’s children. John’s (III) father then left his widow, Mary Tilt, one shilling [£6.68] in his will. The bulk of his estate was left to his second son, William (III).²¹

BIRMINGHAM & BRISTOL

Birmingham by the late-eighteenth century had matured from a village into a prosperous town and now clearly outpaced Bromsgrove in growth.

Iron factors dealt with iron goods – pots, pans, tools – by factoring out their requirements to smaller companies and artisans who manufactured the goods to order.

To understand how the family progressed into glass making means following the story of William Chance (IV), who was educated at a school in Winson Green, Birmingham. Here he forged a life-long friendship with fellow pupil Edward Homer and their friendship matured further when both lads were apprenticed to a firm of iron factors, Messer’s Male and Rock (Factors) of Birmingham.

Soon after their indenture, William and Edward started their own iron factoring business in 1771 at Church Street in Birmingham while both were still only 22 years old, with each providing funds of £700 [£97,757]. This figure, and the fact they had both received a formal education, emphasises that William (IV) came from an already wealthy family.^{21a}

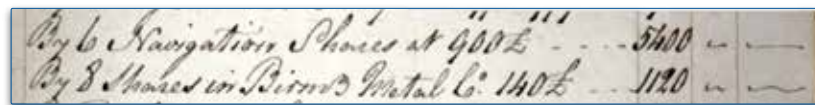
Meanwhile, the seafaring Captain Thomas Chance was employed trading the goods factored by his elder brother, William (III), to early settlers in the Caribbean

and North America. The close connection between Thomas and the Lucas family was also furthered by the mercantile trade Thomas bought back to Bristol.

It is suggested in Robert Johnstone’s MSc thesis, *From Georgian Traders to Victorian Manufacturers*, that the wealth of the Chance family (ergo, that of the iron factoring business) prospered due to links with the slave trade, and the suggestion that Captain Thomas Chance may have even commanded slaving ships in the Trans-Atlantic route.²² A comprehensive search through an online database, of around 36,000 listed voyages, of the five ships mentioned that were financed by William Chance (IV), only the Richmond corresponds to the years quoted, namely 1763–1764, with two voyages departing from Bristol. A further search reveals no mention of a Captain Chance commanding a ship, or a ship’s owner by that name.²³

Instead, it is probably more pertinent to examine the sharp business mind of William Chance (III) and his contacts, including Captain Thomas Chance and the Lucas family. From the account books, the iron factoring business shows the commission from Birmingham artisans of various metal items for resale. These items include hinges, nails, auger bits (drills) and padlocks; standard wares that were normally sold by ironmongers. Later pages though show that the products carried had expanded to include guns, gold jewellery and other objects of wealth, which indicated the business was prospering.²⁴

Guns and furniture were frequently marked “Chance & Homer”, and later “Chance & Co.”, or “W & Geo[rge] Chance”, as the makers. While it is possible the family diversified into manufacturing, given the number of artisans and businesses of these goods already based in the Midlands this is unlikely. However, in 1791, Chance &



Chance & Homer account book, 1791

Courtesy CRL

From a utilitarian corkscrew (right) to a luxury gold watch (opposite); typical items sold by William Chance & Sons

Both courtesy Henry Chance



Homer did buy eight shares of £140 [total £139,728] each in Birmingham Metal Co., and six “Navigation Shares” each costing £900 [total £112,281].

At this time, the accounts show that William and Edward withdrew £1,241 18s 2d [£154,948] each, presumably an annual dividend payment.^{24a}

Regarding the gun trade, Henry Chance, the grandson of Sir Hugh, remarked to the author:²⁵

I have no doubt that William Chance would not have been making guns himself, not from scratch anyway, with blocks of wood to be carved into stocks and ingots of metal to be bored, but that ignores what is common practice in that industry even today. Many of the well-known old companies selling “English” shotguns from addresses in London source their barrels, or locks, or the whole weapon from Spanish factories, for instance. ... It may also be that Chance had the guns put together himself, sourcing the constituent parts from the best or cheapest suppliers. I mention this because in my researches I found a long gun (a musket or rifle) which had a replacement lock – i.e. mechanism – by William Chance, though the rest of the weapon was American-made ... Birmingham was a centre for arms production and there would have been any number of makers who would have supplied the guns or gun parts for export as “Chance and Sons” weapons ... “London” might possibly be a qualitative term rather than geographical, though I appreciate that it would be a very thin veneer to hide behind. “London best” refers to the epitome of the gunmaker’s craft.



CHANCE & HOMER, NEWHALL STREET

When Thomas Chance retired in 1773, he purchased a 95-year lease for land in Ring Close, Birmingham, and built two houses, N^o 17 and N^o 18 Newhall Street, which cost £440 [£55,635], along with a warehouse and stables, costing £220 [£27,817], in nearby Bread Street (now Cornwall Street).²⁶ However, Thomas did not live long to reap the rewards of retirement and died the next year, in June 1774, aged just 53. William (III) then inherited these properties from his younger brother. As mentioned earlier, William (IV) and Edward Homer first traded at Church Street before renting William’s (III) houses and warehouse.

Two years later, Edward Homer married William’s sister, Sarah, although this marriage ended abruptly with the death of Sarah in 1776. In those days, death during, or immediately after, childbirth was a common cause of mortality in women and was often caused by infection (puerperal pyrexia) carried by the doctor, midwife or the implements used. But fortune shone on both men when they married two sisters in 1778; William married Sarah Lucas, whilst Edward married Mary Lucas. The sisters’ father was Robert Lucas who had already conducted business much earlier with the seafaring Captain Thomas Chance, and explains how and why the two families had already forged a relationship. William (IV) and Sarah had thirteen children in all, although four did not live beyond the age of 21. The eldest son, and fourth child, was born on 8th October 1782 and named Robert Lucas Chance, but he was always known as Lucas and is referred to as such hereinafter.

On the death of William (III) in 1802, the properties in Newhall Street were left to William (IV) and Edward Homer. The iron factoring business went from strength to strength and partnerships were renewed successively with every generation.

By 1810, the partnership between William (IV), Edward Homer and Lucas was formally dissolved and then restyled as “Chance, Homer, and Chance”, to include Lucas as a partner.

*William Chance.
Edward Homer.
Robert Lucas Chance*

Chance & Homer account book, 1791

Courtesy CRL



2 Early Glassmaking

To cover the art and science of glassmaking in its entirety would require a complete book in its own right – Harold Newman's *An Illustrated Dictionary of Glass* being an excellent example – so for this reason, definitions and explanations are mainly confined to the manufacture of flat (window) glass.

Amusingly, the definitions of glass faults as published in *A Chymicall Dictionary* of 1650, a “Dienez” is ‘spirits that dwell amongst hard stones’.

CROWN GLASS

Crown glass dates back to the early-fourteenth century when French glassblowers first perfected the art.²⁷ The intricacies of this multi-part process were kept secret by the French and so it was not until around 1680 that it was introduced into England by John Bowles’ Bear Garden Glass-House in Southwark, London.²⁸

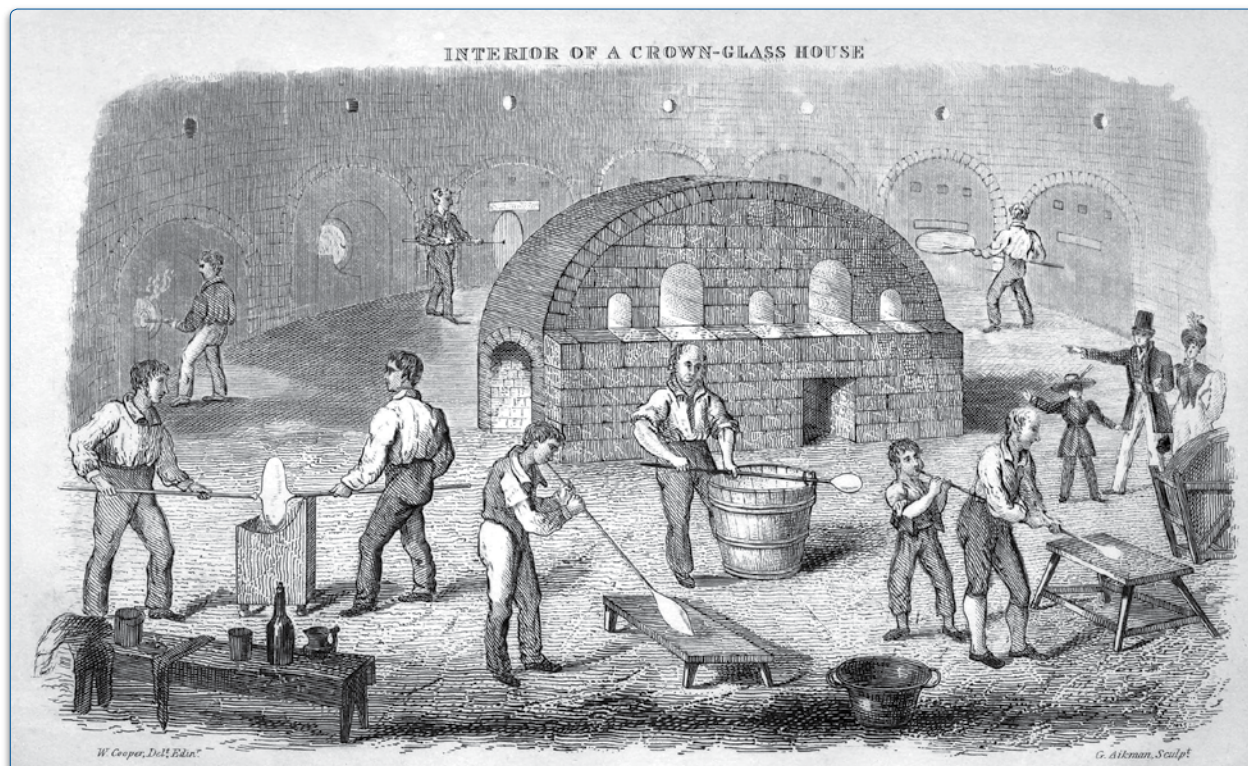
Making Crown Glass

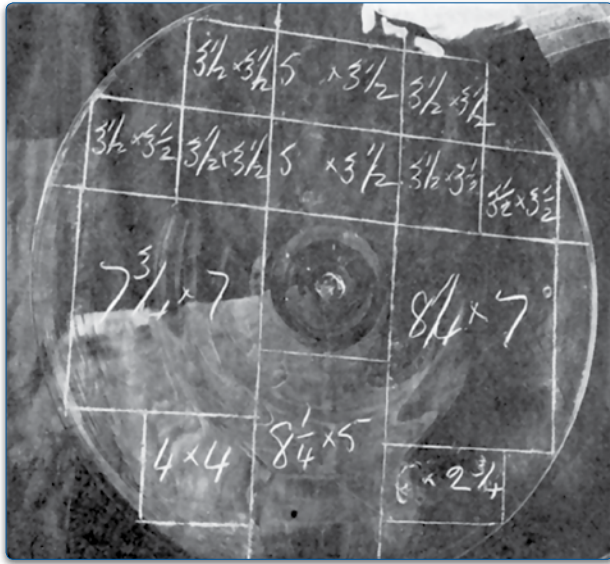
Crown glass is manufactured by gathering the glass at the end of a long tube, the “pundy rod” and blowing a small globe, named the “parison”. The parison is then flattened by rolling on a “marvering table”. Successive blows through the pundy causes the glass to expand and then spinning the pundy rod causes it elongate. After a short period, the end of the flattened globe is pierced and further spinning causes the glass to expand into a whole disc

Crown discs at this time varied in size between 36-in. and 53-in., (91 cm–1.35 m) in diameter, but being round pieces of glass there was much wastage, particularly when larger panes of glass were required. Additionally, the centre of the crown was unusable, although once the “bullion cup” had been invented in 1834 by John Hartley, patent №6,702, the “bulls-eye” glass panes evolved to become ornamental pieces of glass during the nineteenth century. Crown glass produced a far brighter glass and was ideal for glazing windows.

Although there is plenty to dispute about the first introduction of crown glass into England, by 1691, Robert Hooke and Charles Dodsworth patented a process to produce discs of ‘more lustre and beauty than any that had been heretofore made in England’. This led to a battle for supremacy between rival glassmakers. The Bear Garden works in London advertised in 1699:²⁹

The best sort of Window-Glass for Sashes or Pictures, commonly called Crown or Normandy Glass, is made in greater perfection than formerly at the Bear-Garden Glass-House in Southwark and sold at reasonable rates.





STANTON WICK GLASSWORKS, 1787

Robert Lucas' (d.1775), family was of yeoman stock originating from Bromsgrove, Worcestershire, like the Chance family. By at least the 1750s the Lucas family resided in Bristol, where Robert worked as a cooper (barrel maker). Later, he was a partner in a beer and cider works and a warehouse in Nicholas Street, Bristol, while owning shares in a glass bottle works in Limekiln Lane. This lane is almost certainly the current Lime Kiln Road from where the bottle works was sited.

On his death, Robert's only surviving son, John Robert Lucas (1754–1828), inherited his father's interests in 1775, but it was not until 1787 that he established a glass factory under the name Lucas, Pater and Coathupe in the village of Stanton Wick, about eight miles south from the busy sea-port of Bristol. The glassworks was purchased following the bankruptcy of John Adams (who was possibly related to Lucas' wife), the current lessee. The prime reason for the glassworks then was to manufacture bottles and crown window glass.³¹

On later maps, once the glassworks had been demolished, the only reference in the village was a group of buildings named "Glasshouse Farm".

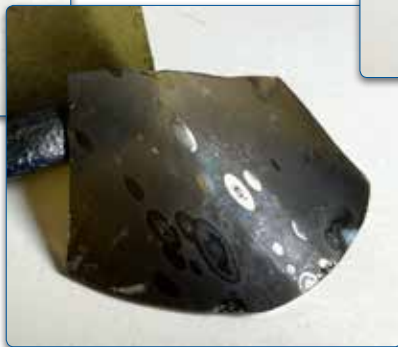
Following the finds of broken glass nearby, there is compelling evidence that apart from manufacturing bottles, the workers at Stanton Wick may have made items that are commonly associated with Nailsea and Wrockwardine (see examples on pp.23 and 24).



Stanton Wick glass cone, a pen & ink drawing by the Rev Skinner

Glass fragments found about a mile from the Stanton Wick site near a bridge called "Bottle Bridge"; possibly a dump. They appear to be part of an olive green vessel with white spots, similar to the spattered glass products manufactured by Nailsea.

Photos © Tim Richards





John Robert Lucas, a painting
by William Armfield Hobday
Courtesy Bristol Art Gallery

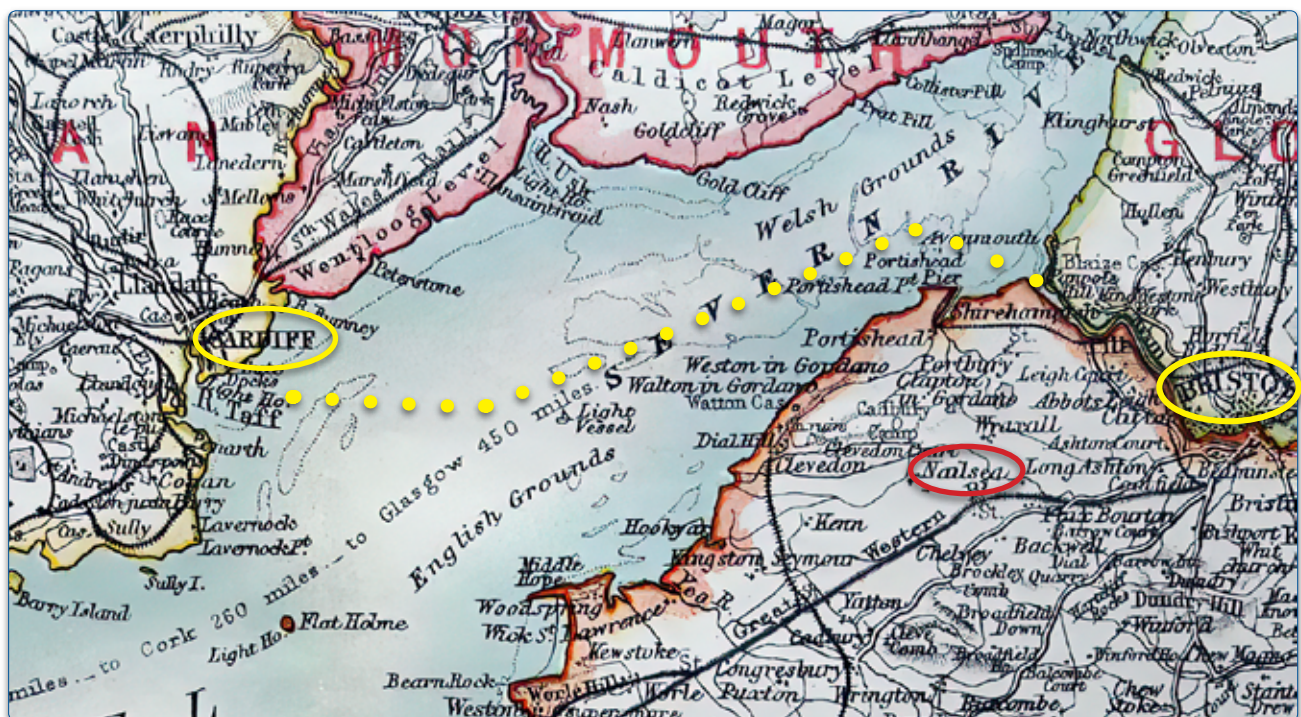
Stanton Wick was described in the personal notebook of the Reverend Skinner in 1815:

... at Stanton Wick, where we baited [ate], that there is a glasshouse, and notwithstanding the workmen, owing to their employment, must be troubled with thirst, the landlady somewhat surprised us by the exhibition of her strongbeer cellar, some of the vats containing 30 hogsheads, and the number of them by no means inconsiderable.

A hogshead was a means to measure the volume of goods, usually tobacco, wine and beer. It was an arbitrary measure, but roughly equated to 52.5 gallons (420 pt; 238.7 litre), so the industrious landlady was storing upwards of 1,575 gallons or 12,600 pints (7,160 litres) of beer. The reason for such large quantities being stored is explained by the need for glass workers to stave off dehydration with a prolific supply of beer.

The sanitation of the water supplies around the world was such that it often became contaminated and was a cause of sickness and even death. The beer, being heated to high temperatures, removed all such doubt although the sobriety of the workers was another matter.

The sea route between Cardiff and Bristol ports, where kelp was transported. Nailsea is circled in red





It appears that Lucas, Pater and Coathupe purchased an existing glasswork as the site was recorded as being originally founded in 1658,³² and for good reason as Stanton Wick was ideally situated for making glass: an open-cast sandpit and at least six coal mines were in the locality. The clay for the pots in which the glass was melted may have been sourced from Bristol City Centre at St Thomas Street, already a suitable supply for local potters. The kelp (seaweed) used as an alkaline flux (see below) was probably collected on the shores of the Vale of Glamorgan, burnt to create the ash and shipped across the Bristol Channel from Cardiff to Bristol port.³³

The collection and processing of kelp were first described in Christopher Merrett's translation of *L'Arte Vetraria* (The Art of Glass) 1662, that was originally published in 1612 by the Florentine priest, Antonio Neri (1576–1614).

*The common Sea-wrack ... is thrown and scattered upon the rocks, in great abundance, and also on the shoar, which country people in the summer rake together, dry it as they do hay, by exposing it to the Sun and Wind, and so turning it as occasion serves till 'tis fit to burn, and make these ashes call'd Kelp, used as well to make Alume as Glass.*³⁴

The addition of the burnt ash, an alkali (*alume*) derived from the kelp, was an aid to significantly lowering the melting temperature of the glass, with the resultant lessening of fuel, time and savings in production costs.



A 1669 reprint of Antonio Neri's *De Arte Vitraria* (The Art of Glass), published some 55 years after the author's death

Typical kelp could be readily found and was harvested from the shores

[Wikipedia](#)



NAILSEA GLASSWORKS, 1788

Within eighteen months of the foundation of the Stanton Wick glassworks, John Lucas looked to expand further and purchased six acres of land at Nailsea, nine miles (14.5 km) to the west of Bristol, and twelve miles (20 km) north-east from Stanton Wick, with the purpose to build yet another glassworks. It appears that both factories worked in tandem until 1816 when the lease was given up at Stanton Wick, seemingly due to a dispute between Lucas and his father-in-law, William Adams.³⁵

To finance the building of the new glassworks, in August 1788, John Lucas advertised his beer and cider works in Bristol for sale, while also dissolving his interest in the glass bottle works, hoping to realise £3,000 to £4,000 [£374,000 to £499,000].³⁶ This was followed by the erection of a second furnace.³⁷ Evidently, this effort to raise funds was not immediately fruitful and it was not until 1793 when he established a new partnership with William Chance (IV) and Edward Homer, that the new Nailsea glassworks became viable.

Cider manufacture has its ancient roots firmly planted in Somerset – with a firm nod towards Kent, Hereford and Worcestershire. It is perhaps no coincidence that in 1788 a new factory called Coate's Cider Factory was started in Nailsea by Redver Coate; tying in with the need for the glasshouse to manufacture bottles, even if there is no other immediate connection between the two. The Coates factory survived until 1975 before finally closing its doors.³⁸

The link between the Lucas and Chance families is explained by Captain Thomas Chance, who first established links between the two families whilst engaged in his mercantile business. Sailing from Bristol, he traded extensively with the Lucas family; predictably, given that the Lucas estate bordered land occupied by the Chance family.

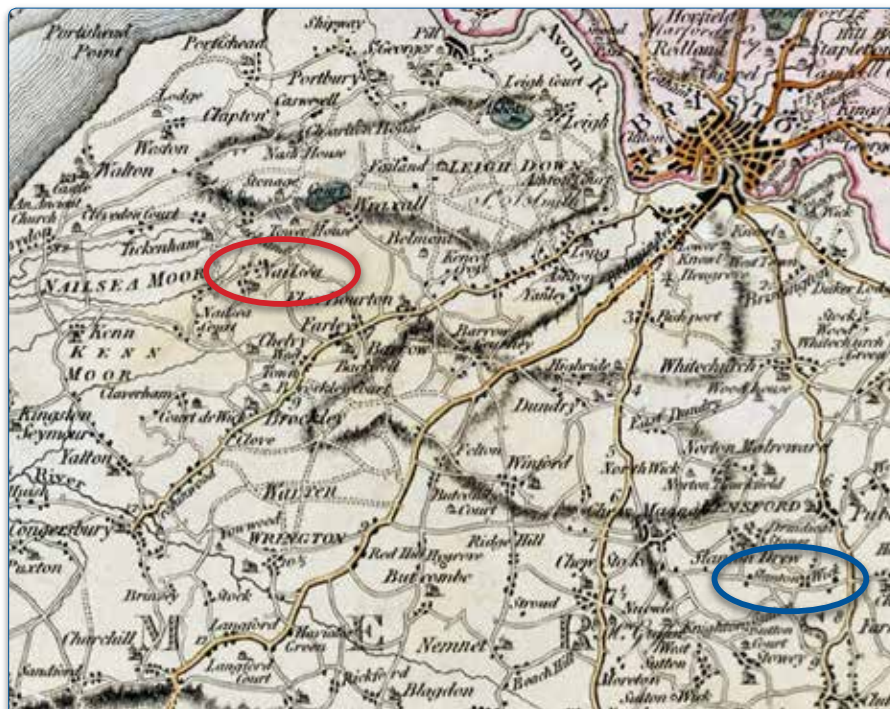
Once William (IV) and Edward Homer replaced one of the partners at Nailsea, presumably Pater, this left John Robert Lucas and William Coathupe within the partnership. Henry Pater was Lucas's brother-in-law and had a glasswork at nearby Bishport in Bedminster, so probably opted out considering his resources were being stretched between three glassworks.³⁹

A deed renewing the partnership was drawn up in 1807, showing that the value of the company was £60,000 [£4.56 mn]. John Lucas provided £33,000 [£2.51 mn] (33 shares and the controlling interest, 55%), William Coathupe £10,000 [£760,713] (17 shares, 28.3%) and William Chance and Edward Homer £8,500 [£646,606] each (total 10 shares, 16.7%).⁴⁰ As a result, Edward Homer left Birmingham in 1794 to reside at West Town, Backwell, close to Nailsea, to take up a managerial position.

Edward Homer finally retired from the Birmingham business in 1821 and sold the house in Newhall Street to William Chance (V), but remained a partner in the Nailsea works until he died in 1825.

William (IV) remained as a partner at Nailsea but misfortune struck when his wife, Sarah, died on 7th September 1809. This was a grievous blow to William who appeared to lose his desire for the day-to-day business and handed over his share of the Nailsea concern to Lucas Chance. This came at an opportune moment for the glassworks as the firm was in jeopardy, with falling profits, problems with suppliers, and increased excise duties to pay.⁴¹

All interests of the Chance family in the Nailsea glassworks ceased when William Chance (IV) retired in 1821. Nearly fifty years later, the Chance name resurfaced to become synonymous with Nailsea, but not for the best reasons.



An 1801 map showing Bristol, Nailsea (red) and Stanton Wick (blue); roughly equidistant at 10 miles by road between each other. A coal mine can be seen just north of Nailsea

ROBERT LUCAS CHANCE

(Robert) Lucas Chance (1782–1865), always known as Lucas (hereinafter referred to as thus) and the eldest son of William (IV), was a gifted businessman from a strictly Protestant upbringing, which gave him the strong constitution to achieve his aims and forge a glassmaking business that survived for 159 years. The use of the middle name became a common idiosyncrasy by some members of the Chance family; Sir William Hugh Stobart Chance was always known as Sir Hugh, for example.

As an example of his resilience, in 1794 and aged only twelve – around the time Edward Homer moved to Bristol – he entered his father's iron factoring business in Birmingham. Within two years he became a manager and was known as "The Little Master in the Jacket", a position he retained during his time at the firm. It is believed that the "Jacket" actually refers to a waistcoat, so seemingly Lucas, even at the precocious age of twelve, was quite prepared to roll up his sleeves and get involved.⁴² Eventually, Lucas was made a partner at Nailsea on 1st January 1804 at the age of 21.

An early philanthropic act by Lucas is recorded in *Aris's Birmingham Gazette*, 2nd December 1805, when he donated one guinea (£1 1s [£75]) towards a monument to commemorate Admiral Lord Nelson. In 1809 a similar sum was donated to Lancaster School in Birmingham. On visiting Nailsea in 1810 Lucas became engaged to Louisa Homer (1787–1873), his cousin and the daughter of Edward Homer. The couple married on 7th May 1811 and lived in a rented house in the nearby village of Wraxall, which was less than two miles (3 km) from Nailsea.

At around this time, Lucas sent his youngest brother Henry (1794–1876) to Bristol in an attempt to revive the fortunes of the Nailsea factory. But within a few weeks of Henry taking office, Lucas took back charge of the works. The reason is explained further by the advice given to Henry that he should avail himself of what was considered an exceptional opening in the office of Messrs Cooke & Sons, Solicitors.

Lucas wrote somewhat sagely his reason for suggesting this firm:⁴³

Mr. Cooke's hours, nine till nine, give young men very little opportunity of being wicked should they be so disposed

It suggests that Henry, at just sixteen years old, was a little wayward and needed stricter moral guidance, although perhaps Mr Cooke's regime worked as Henry eventually qualified as a solicitor and was later called to the Bar at Lincoln's Inn.

The goods from Nailsea were transported to Bristol port via Ashton Road, a distance of about eight miles (12.8 km), for distribution and export. However, it became troublesome to the owners when the drivers termed a "Wagoneer" of the "dillies", as the wagons were called, were being used to '... deliver out Goods, Parcels, &c. on the road between Bristol and Nailsea', as seen in an advertisement placed in the *Bristol Mirror*.⁴⁴ This was probably a useful way for the Waggoneers to earn extra money, with very little effort.

Perhaps this lesson was not learned, as nearly a year later a further advert was placed asking for a Waggoner; 'a sober, honest, and steady Man'.⁴⁵

ASHTON ROAD.
LUCAS, CHANCE, HOMER, and Co. having experienced great inconvenience through their Waggoners stopping to take up and deliver out Goods, Parcels, &c. on the road between Bristol and Nailsea; the Public are respectfully requested not to send any thing by them in future.
Nailsea Glass-Works, 1st June, 1814.

Bristol Mercury, 4th June 1814, imploring people not to use the Nailsea Glassworks Wagons for despatching goods

A WAGGONER WANTED, to drive the GLASS-HOUSE WAGGON to and from Bristol to Nailsea; a sober, honest, and steady Man, who will meet with a good place, by applying to Messrs. LUCAS, CHANCE, and Co. either in Nicholas-Street, Bristol, or at Nailsea Glass Works.

On 1st April 1815, the Nailsea Glass Works advertises in the *Bristol Mirror* for a 'sober, honest, and steady Man' to transport goods to Bristol

Both images courtesy of BL

FRIGGERS AND FOREIGNERS

Even today the practice of some glasshouse workers is to create intricate objects of wonder and it was sometimes a practice encouraged by the company, giving the workers free rein to experiment and practice other glassmaking skills. Nothing demonstrated the art of the glass blowers better than the walking sticks, intricately shaped pipes and other ornamental items that were produced. The term applied for these items is “friggers” and is a term still used today.

Despite the claims of many collectors, it is highly unlikely that the intricate flasks, jugs and bowls produced with the identifiable decoration of pulled loops of opal glass marvered into a base colour, were made at Nailsea, according to Sir Hugh Chance.⁴⁶ This is because Nailsea was foremost a producer of crown window glass and, later, sheet and rolled glass.

As a window glass manufacturer, those items Nailsea produced were made with the glass available to it, namely, clear, bottle-brown and bottle-green glass, the latter two were from materials possibly sourced from the nearby bottle works. These vessels were invariably made with the looped opal “pulled feather” decoration and “spattered” glass. In common with many other glassworks it is quite probable that friggers were also manufactured there by the workforce from the glass remaining in the pots at the end of the working day. This was a practice that was normally encouraged by the employers to improve the glassmaking skills of their workers.

To reaffirm this, Margaret Thomas writes in her splendid booklet *The Nailsea Glassworks*:⁴⁷

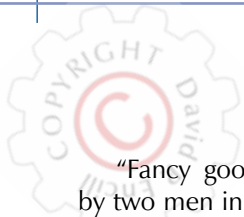
*Window glass and bottle were the main products of the Nailsea glassworks. Where then, was made the glass for which Nailsea today is so famous? This glass consists of a variety of domestic articles made in bottle and window glass but enlivened with flecks of threads of coloured glass, in a style known as the latticino effect [actually lattimo]. This was achieved by dropping small beads of white opal or enamel into the green window or bottle glass and trailing it, or splashing flecks on to the glass, and may have been introduced into this country by workers at Nailsea. However, Nailsea glass was the name given to a type or style of glass: most “Nailsea Glass” was never made at Nailsea and it is impossible to make a definite identification of the place of origin of any particular piece since it was widely imitated.**

Apart from the misconception of how the glass effects were created (see caption below), Margaret Thomas continues that this area of controversy was propagated following a series of articles written by St. George Gray, the curator at Taunton Museum, in the *Connoisseur* magazine, in June 1911, June 1920 and March 1925. Gray mistakenly made attributions of a collection of glass built up by a Mrs Challicombe as being entirely made in Nailsea. As an example, another glass company at this time, Wrockwardine in Shropshire, also made similar coloured glass with the spattered style.^{47a}



*Nailsea Glassware

The “pulled feather” looped decoration (far left; aka “festooned”, “pulled feather” or “combed”) opal *filigrana* seen on the jug (far left) is made by forming a glass “parison” (a billet of glass that is partly inflated on the blowing tube) and rolling the malleable hot glass over pre-arranged white *lattimo* (tr. *latte* = milk) canes of opal glass (“marvering”) to include them. After reheating, a nail (or similar) was then pulled across the lines to create the feathered effect. Blowing the glass to shape then expands the decoration accordingly. “Spattered” glass (left) is made by sprinkling metal oxides onto the marvering table and rolling the hot glass parison to pick up the oxides. After reheating and blowing to shape, the inclusions expand to create the spattered effect



"Fancy goods" were nevertheless made at Nailsea by two men in a side furnace. However, these included propagators, cucumber glasses, fish bowls and glass shades, all from the same green-tinted clear glass used for making windows, along with rolling pins, jugs, and decanters in clear, green or brown colours.⁴⁸

Typical friggers were the humble rolling pin, barley-twist walking sticks, flasks, paperweights and pipes. The rolling pins often bore a motto such as "Be true to me" and given by a sailor to his wife or fiancée. These items were then sold to sailors visiting Bristol docks and distributed around the world, which erroneously propagated the Bristol name and style. The term "Bristol Blue" used to describe cobalt-blue glass supposedly made in Bristol, is very much misunderstood and was due to the import of cobalt into Bristol from Germany.⁴⁹ This led to all manner of blue glass being incorrectly attributed as so-called "Bristol Blue" glass.⁵⁰

Such ornaments have also been attributed to workers from Chance, and the practice to which many of the managers probably turned a blind eye, such was the relaxed environment at Chance Brothers. Essentially, it was considered to be a perk of the job, provided the practice did not become overtly commercial and provided the workers did not take liberties, then the cost to the company was negligible.

However, not every glasshouse was so disposed of its workers making friggers. In a notice to workers at the Rotherham Glass Works, it states:

Workmen are strictly prohibited using the Metal for any other purpose than making their Work. Anyone found making, or carrying off the Premises, Glass Walking Sticks, or other Fancy Articles, Bottles, &c., without having first obtained permission, will be punished.

This notice may have resulted because of the stringent excise duty that was in force at the time, where all the glass in a pot had a duty imposed upon it, whether it was used or not. Any frigger once made, therefore, already had the duty paid for by the owners while being avoided by the workers.

A colloquial Midlands and Black Country term for the frigger is a "foreigner", which refers to an item that was illicitly produced, but normally for personal use, not necessarily commercial gain.

Typical Nailsea-style spattered glass products

© Chiswick Auctions, with kind permission



WILLIAM CHANCE V, EARLY YEARS

In 1811, one of William Chance's (IV) younger sons, William (V), married Phoebe Timmins. In 1814, Phoebe gave birth to James Timmins Chance, who joined the company in 1839, rising to become Britain's foremost lighthouse engineer and responsible for establishing the lighthouse department of Chance Brothers in 1850.

By 1813, the *London Courier & Evening Gazette* noted that William Chance (V) was chosen by the High Bailiff, Richard Spooner, to serve on a committee to act upon the growing instances of fraud arising through auction houses.⁵¹ Two others on the committee were a Mr Cadbury, whose sons later founded the eponymous confectionery firm in Birmingham, and Thomas Beilby, who may have been related to the famous family of glass enamellers, c.1760. The young William (V) eventually rose to be a constable, as his appointment was noted in November 1817,⁵² and he later become High Bailiff in his own right in 1829 (see p.58).

The first recorded case of philanthropy from William was noted in the *Morning Post*, where he donated the not inconsiderable sum of 10 guineas (£10 10s [£740]) towards the Strangers' Friend Society, an organisation that provided relief to the poor in London. During 1815, it was recorded that the Society had attended 6,975 cases and had provided £2,896 [£213,364] of relief.

In a charity drive to aid the General Hospital, Birmingham, a William Chance, Esq. – presumably William (IV) – was noted in October 1820 as donating £12 [£959].⁵³ Another charitable cause that sought to create aid for the Sunday School Society for Ireland saw William (V) appointed as Secretary, in May 1822⁵⁴ and then re-elected in May 1825.⁵⁵

While the more sophisticated products were being offered by the iron factors, a newspaper advertisement placed in *Aris's* for a tinman (below), suggests that William Chance & Son was advertising on behalf of a manufacturing company 'at some distance from Birmingham'. Perhaps this action was to assist one of Chance's suppliers in finding suitable workmen.

Courtesy of BL

TINMAN WANTED.
A Person who thoroughly understands his trade may hear of a comfortable situation at some distance from Birmingham; if he has a knowledge of plumbing and bright work he will be much preferred. Apply to WILLIAM CHANCE and SON, Birmingham.

Besides the flourishing factoring business, the increasing wealth of William Chance (V) could also be linked to an assignment of John Greenwell's "Estate and Effects" of 1823 to 'William Nicholson and William Chance, of Birmingham, Merchants'.⁵⁶

In 1819, William Chance (IV) is noted as residing at Lower Smite Farm in Worcestershire, while Edward Chance was residing at Smite Estate.⁵⁷

JOHN HARTLEY

John Hartley (1775–1833) from Dumbarton had gained a reputation as the leading crown glass expert in the country and this kindled an interest in Lucas.

Allegedly, in 1812 Lucas travelled to Dumbarton, roused Hartley out of bed, and brought him straight back to Nailsea. Dumbarton Glass Works (fl.1777–1850) had at this time 'built a reputation for making the finest crown glass for windows' and was supplying over a third of all Britain's glass.⁵⁸



Dumbarton Glassworks, c.1800, with three working cones, demonstrates a thriving industry

By December of that year, an ecstatic Lucas wrote again to Henry of the great success of acquiring his new manager, 'I could not resist the temptation of giving you information that I am sure you will rejoice at'.

While Hartley proved to be a great asset to Nailsea, three years later Lucas decided to strike out on his own as an independent businessman and in 1815 he left the now prosperous firm of Nailsea to set up as a glass merchant in London.⁵⁹

A Break from Nailsea

Lucas Chance's first residence in London was 14 Upper Gower Street until at least 1819, with his first business premises at 2 Coleman Street Buildings,⁶⁰ and close by at 25 Upper Thames Street, St Paul's Wharf. Lucas' personal account books show that he went into partnership with Joseph Dixon of the Dumbarton Glass Works, who appears to have had a 33% share in this new venture.⁶¹

The years at Nailsea had been well spent; Lucas had learned much about glass manufacture and its trade, which equipped him with the knowledge and confidence to venture out on his own. He was seasoned in business management and travelled far more into Europe with the expansion of trade following Napoleon's defeat at the decisive Battle of Waterloo, on 18th June 1815. This allowed him to associate with other glass traders and set up new contacts essential to an entrepreneur. The new company traded as "R. L. Chance & Company".

In 1816, to separate exports from the inland trade, Lucas leased a warehouse at 55 Skinner Street, Snowhill, in London, just over a mile from Upper Thames Street. This warehouse was named "The Bristol & Dumbarton Window Glass Warehouse" that incurred an annual rent of £14 10s [£1,170].⁶² During this year, perhaps requiring all his capital in London, he sold the remaining shares he held in the Nailsea glassworks.

The glass merchant business prospered and accounts for the year ending 31st December 1821 show a net profit of £1,919 [£174,327], with Lucas apportioned £1,439 [£130,722] and Joseph Dixon £479 [£43,513].⁶³ This indicates a two-thirds to one-third split in favour of Lucas, but the partnership was nevertheless dissolved on 1st June 1822.⁶⁴ The returns for 1822 then showed a sharp increase in net profit after interest payments of £206 [£21,657] to £3,446 [£362,286], with it being apportioned to Lucas at £3,206 [£337,054] and Dixon at £239 [£25,126] – Dixon's share being reduced to the half-year when the partnership terminated.

The link with Dixon and the Dumbarton Glass Works is enlightening; it was from this company that Lucas allegedly "poached" John Hartley in 1812, but it is entirely possible that some arrangement had already been forged with Dixon.

Although Lucas and Sarah were blessed with ten children, it was only the fifth child that was the son and heir that survived to reach his majority. Robert Lucas Chance Jnr (referred to hereinafter as Robert) was born in Brighton on 18th September 1821 and it was around this time that Lucas left Gower Street and moved his residence at the top of Highgate Hill to a house with a large garden where he formed an acquaintance with the poet Samuel Taylor Coleridge (1772–1834) and other notables who resided in the vicinity.

It was during a dinner party in 1824 at Dr James Gillman's house, a neighbour to the Chances, that Coleridge noted in his diary,

*There was also a Mr Chance who broke out at last by an opposition to Mr Ir: which made the good man so angry that he exclaimed "Sir I reject the whole bundle of your opinions."*⁶⁵

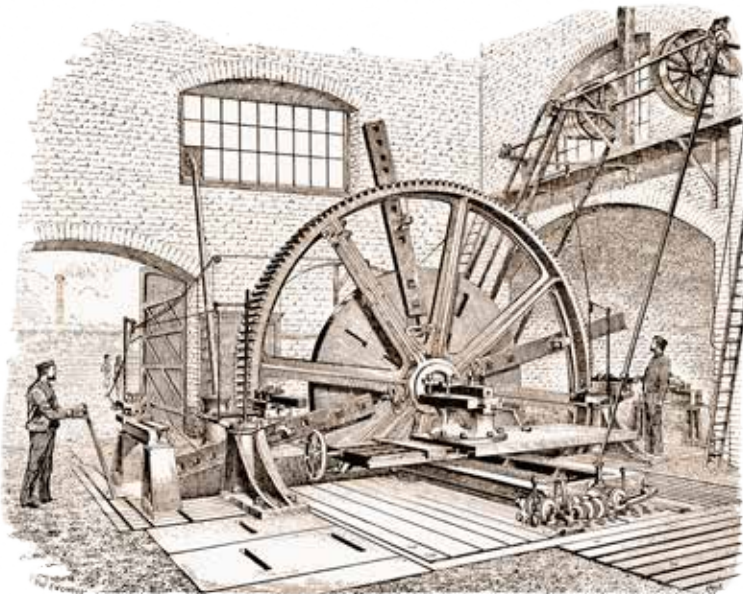


One of only two portraits of Lucas Chance.
This one probably dates to around 1850
[Courtesy Henry Chance](#)

Gillman was a 'physician of addiction' who was helping Coleridge to tackle his opium dependency. From 1816 when the two first met, Coleridge spent the rest of his life residing at Gillman's house. The "Mr Ir" referred to is Edward Irving (1792–1834), a Scottish clergyman.

Other members of the Chance family featured in Coleridge's diaries, such as Edward Chance (1792–1866), Henry Chance (1794–1876) and Miss Chance, all siblings of Lucas. Henry Chance, Lucas' younger brother, later became a barrister and the two corresponded frequently. In 1827, Edward went into partnership with Thomas Hurst to form a publishing company, Hurst, Chance & Co.⁶⁶

In 1830, the company published a book by Coleridge, and *The Mourner* by Mary Shelley (1797–1851), the famous author of *Frankenstein* and wife of Percy Bysshe Shelley (1791–1822), another famous poet.^{66a} In 1826, Edward Chance petitioned the House of Commons with an invention that made the forging of banknotes more difficult.⁶⁷ It is assumed this is the same Edward Chance of Hurst, Chance & Co. and who died, unmarried, in 1866.



An example of a steam-driven lathe at the Soho Manufactory

SMETHWICK: GROWTH OF INDUSTRY

Smethwick grew rapidly from a small hamlet to a thriving industrial town in a very short time. The main reason for this was the canal system that afforded companies a means to ferry their goods to all parts of the kingdom that would have appealed to any industrialist starting a new venture.

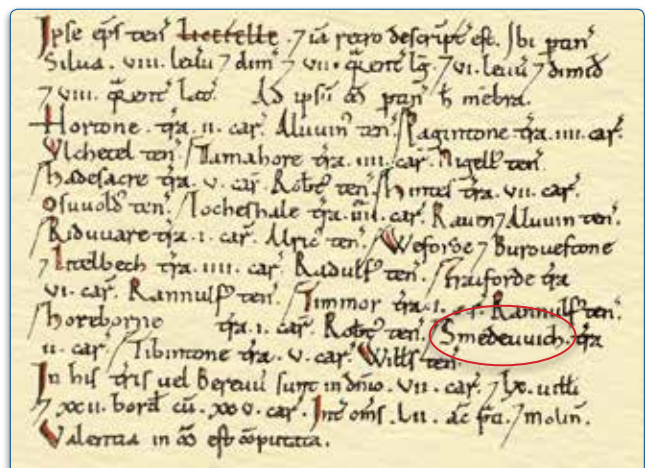
The origin of the name Smethwick (known colloquially as *Smerrick*) might derive from a "smith's dwelling" or building *smeotha* (smith) and *wic* (dwelling or building),⁶⁸ although another interpretation given by Smethwick Local History Society is "smethe" meaning a level field or plain can be attributed to the Saxons in 715 AD, as no evidence of early metal working has been found in the area.⁶⁹

The *Domesday Book* records "Smedewich" within the manor of Lichfield and held by the Bishop, with Smethwick having enough land for two ploughs.⁷⁰

By around 1800, Smethwick was an outlying hamlet of the parish of Harborne, however, the growth of industry radically changed this balance. As Smethwick expanded, it became obvious that the church of St Paul's, Harborne, could no longer handle the parishioners from the increasing population, which was some 2½ miles distant and would have required something like a one-hour walk each way, while those more fortunate owned a horse and carriage.

Given that the vast proportion of the population was probably working a six-day week, a two-hour journey added to a further two-hour sermon took away a considerable amount of the parishioner's free time. In 1732, a new church was built called Smethwick Chapel, which is now known as Smethwick Old Church, which alleviated the problems of travel.

Before the first Industrial Revolution, which is emphasised by the start of mechanisation from 1760 to between 1820 and 1840, Smethwick was a hamlet consisting of 'small groups of cottages separated by tracts of woodlands and small farms, strung out along the road from Birmingham to Dudley'.⁷¹



Domesday Book extract for Smethwick

Courtesy of Professor J. J. N. Palmer and George Slater



This changed once James Brindley (1716–1772) cut the Birmingham Canal from 1768 to 1769, which was further improved in 1826 by Thomas Telford (1757–1834). The new canal started to attract manufacturing to the area, particularly along the canal sides as this encouraged more trade with a ready-made shipping route: analogous as the motorways of the eighteenth and nineteenth centuries.

The most prominent factory was the Soho Foundry, built in 1795 for Matthew Boulton (1728–1809), James Watt (1736–1819) and, later, William Murdoch (1754–1839), who together pioneered the steam engine, following the work of Thomas Newcomen (1664–1729). From here, smaller metalworking factories started in the area using steam engines from Soho.

The canal network offered the means to ship large consignments around the country, and as Birmingham was ideally situated as a hub for all major cities – London, Manchester, Bristol, Sheffield – the town grew to become a centre of manufacturing.

In addition to the Soho Foundry, the quaintly named Arthur Keen's Patent Nut and Bolt Co. Ltd, a business originally established at Smethwick from 1856, eventually became Guest, Keen and Nettlefolds (now GKN plc, a global engineering group).

A statue commemorating Boulton, Watt & Murdoch, Birmingham city centre



BOUNDARY CHANGES

After shuffling across three different county boundaries (Shropshire, Worcestershire and Warwickshire) over two centuries, in 1974 Smethwick found itself located in Sandwell, part of the new county of the West Midlands.

From a historical point of view, the former junction of these three counties was located on Harborne Lane at the ford of Bourn Brook. It is believed that in the mid-nineteenth century, illegal animal baiting – outlawed in 1835 – was still practiced. This point was chosen for such activities because if constables from one area raided the event, the perpetrators simply moved across the brook and outside of their jurisdiction, to avoid arrest.

THE EVOLUTION OF SMETHWICK

In a description of Birmingham and its environs, Charles Pye writes in 1818:

*There are in Smethwick some works of considerable magnitude, viz. Messrs. Boulton and Watt's manufactory for steam engines; an extensive soap work, belonging to Messrs. Adkins and Nock; a manufactory of brass, under the denomination of the Smethwick brass company; and also one of British crown glass, belonging to Thomas Shutt and Co. There is a house called the Beakes, where Wm. Wynne Smith, Esq. resides.*⁷²

Smethwick evolved into an area of manufactory and the glassworks that became world-famous was already worthy of mention. The most prominent of these firms was Boulton & Watt.

Although far removed from the manufacture of glass, the Soho Foundry built by Boulton and Watt in 1795 set the seal in establishing large manufactories in Smethwick. This new factory was introduced following a difficulty in sourcing parts for its steam engines and was instrumental in encouraging new and allied industries to Smethwick.

The company also revolutionised manufacturing by designing new steam engines with interchangeable parts thus eliminating the requirement for bespoke parts for every order.

The Black Country, so named either because of the soot and grime emanating from the factory chimneys that blackened the local buildings, or the land under which the coal seam ran, was described by Elihu Burritt as 'black by day and red by night'.^{72a}

The left-wing politician and prospective candidate for the Bilston ward in 1932, Anthony Eaton, went further and described the town:^{72b}

Surely no place could have grown up so ugly as this, without some evil mind having deliberately planned to wipe out every last trace of beauty.

A phrase that did not endear him to the electorate.

There is no escaping that life was grim in the early-nineteenth century and none more than in the highly industrialised areas like Birmingham, Sheffield, Manchester and, of course, the Black Country.

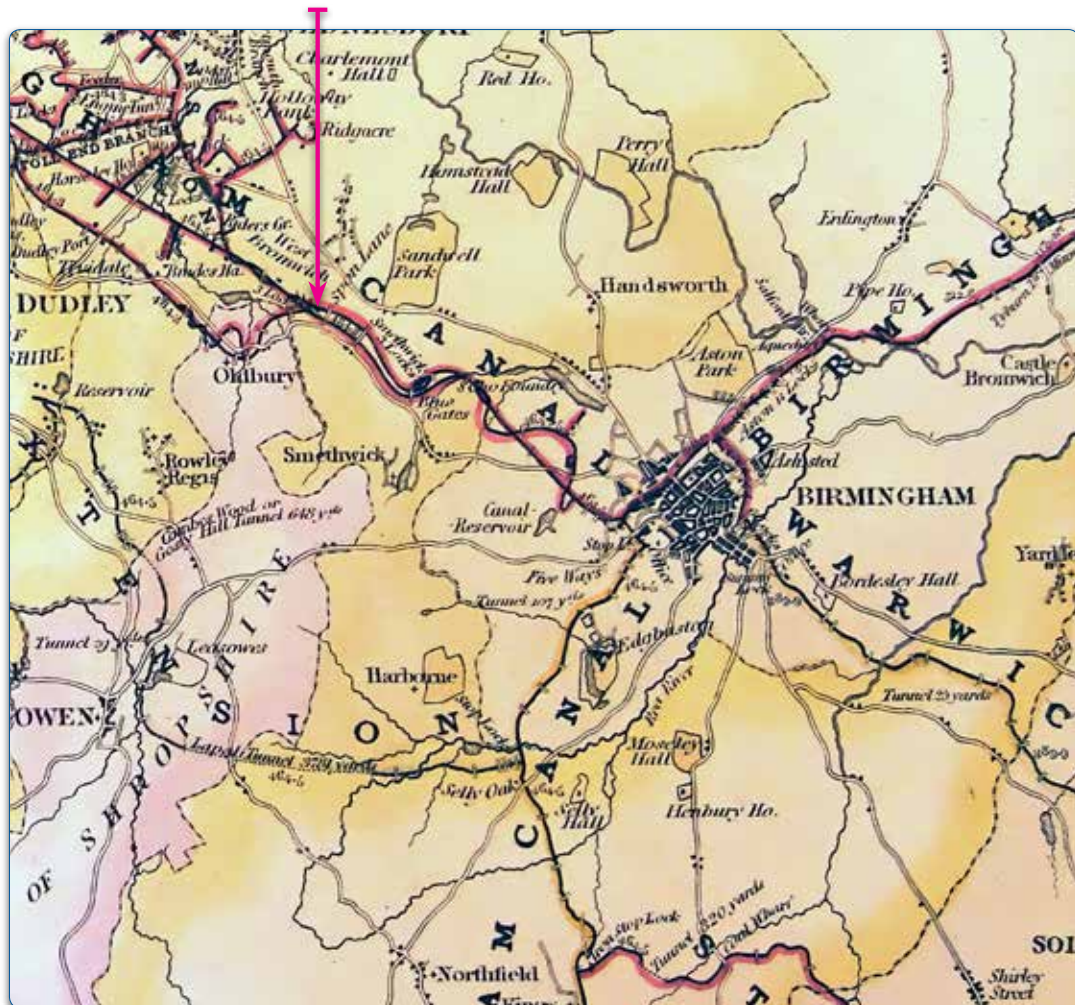
As a footnote to the differences between Birmingham and the Black Country, the two are quite separate areas and are distinguishable by very different dialects. "Aynoch and Ali" (Enoch and Eli) certainly derive from the Black Country. Besides this, Birmingham firms did offer better wages and working conditions.

Although any division between the two areas has long since been concreted over, there still exists a friendly rivalry between the two.

With Smethwick floating rather conveniently across the Birmingham and Black Country boundaries, during the nineteenth century Chance Brothers favoured using a "near Birmingham" postal address well before Smethwick was absorbed into the West Midlands county boundary.

The route of the old and new Birmingham Canals can be seen in this 1831 map.

The Spon Lane junction is just about visible at the intersection of the two canals.



SPON LANE

The land that eventually housed the British Crown Glass-Works Co. was formerly part of the demesne lands (land associated with the manor and set aside for use by the owner) of Blakeley Hall, the Manor House of Oldbury, about three miles west of Birmingham. It covered about thirty-two acres,^{72c} and formed an irregular rectangle bounded by the old Birmingham canal, Spon Lane (known to have existed in 1694), the Birmingham to Dudley Turnpike road and by a brook that divided the Harborne and Halesowen parishes.⁷³

The meaning of "spon" might derive from "spoon" and on occasion the road was referred to as "Spoon Lane". Although the road today is quite straight, on earlier maps there is a slight curve on the north side after Spon Lane station that does resemble the shape of a spoon. Another possibility is that the name spon is an old English term for a wooden roof tile or shingle, of which the maker was referred to as a "Sponner".⁷⁴ Whatever the true origin for the name, it has long since vanished over time.



4 British Crown Glass-Works Co., 1814–1822

A survey of the land bordered by Spon Lane, Oldbury Road and the Birmingham canal was made by a Birmingham architect, John Kempson, in August 1810, for dividing into lots for sale by auction. This was conducted at the Bulls Head Inn, West Bromwich, on 14th December 1810. The land was described on the map as the,

Estate of Smethwick in the Parish of Harbourn (sic) and County of Stafford, belonging to the Rev. Mr Simpson in the occupation of Benjamin Darby

The latter was well known in Smethwick, as the family were farmers in the area and places can be found in the area bearing the name Darby.

This plan eventually hung on the Chairman's office wall at Chance Brothers and includes notes in Lucas Chance's handwriting, indicating the dates when various portions of land were acquired by the firm and the persons they were purchased from. The farmhouse was close to the brook and the names of the fields indicated the purposes for which the land was used.

The founder of the original glassworks on the Spon Lane site was believed to be Thomas Shutt who originally came from Westminster, London. A later "Copartnership" agreement dated 30th May 1816 (below), possibly to refinance the company, includes the following persons:

Richard Shutt of Bath Place, Fitzroy Square in Middlesex; Thomas & Philip Palmer, both from St Martin's Lane, London; Nathaniel Chater (c.1758–1821)⁷⁵ of St Dunstan's Hill in the City of London; Thomas Shutt (c.1763–1822) of Smethwick in Staffordshire.

The capital of the joint stock company was divided as follows:

Richard Shutt	£2,538 11s 4½d	19.05%
Thomas Palmer	£1,585 10s 10½d	11.9%
Philip Palmer	£2,538 11s 4½d	19.05%
Nathaniel Chater	£5,077 19s 7½d	38.1%
Thomas Shutt	£1,585 10s 10½d	11.9%
TOTAL	£13,326 4s 1½d	[£939,000]

Although Chater had the largest share, Thomas Shutt was the driving force behind the British Crown Glass-Works Co. It is possible that Chater, at about 58 years of age, was simply an investor and saw potential in the new venture. The relationship between Richard and Thomas Shutt is unknown, but apart from the 1816 indenture, nothing more is mentioned of Richard Shutt.

The company purchased about fifteen acres of land called Blakeley Hall farm in Smethwick, which extended from the old canal to the turnpike road (now Oldbury Road) in a north-south direction. The width of the land (east to west) varied at several places due to the number of plots that were originally auctioned in 1810.⁷⁶

The region was chosen astutely as there was a plentiful supply of coal from nearby mines and clay for the pots was almost certainly sourced from nearby Himley.

A single-cone glasshouse was built and the production of crown glass commenced in 1815. From 1816 the works was trading under the name of The British Crown Glass-Works Co. and the factory afforded employment to both skilled and unskilled workmen in the locality.

When Thomas Shutt died in October 1822, aged 59, the impetus for the company appeared to have gone. His short obituary stated:⁷⁷

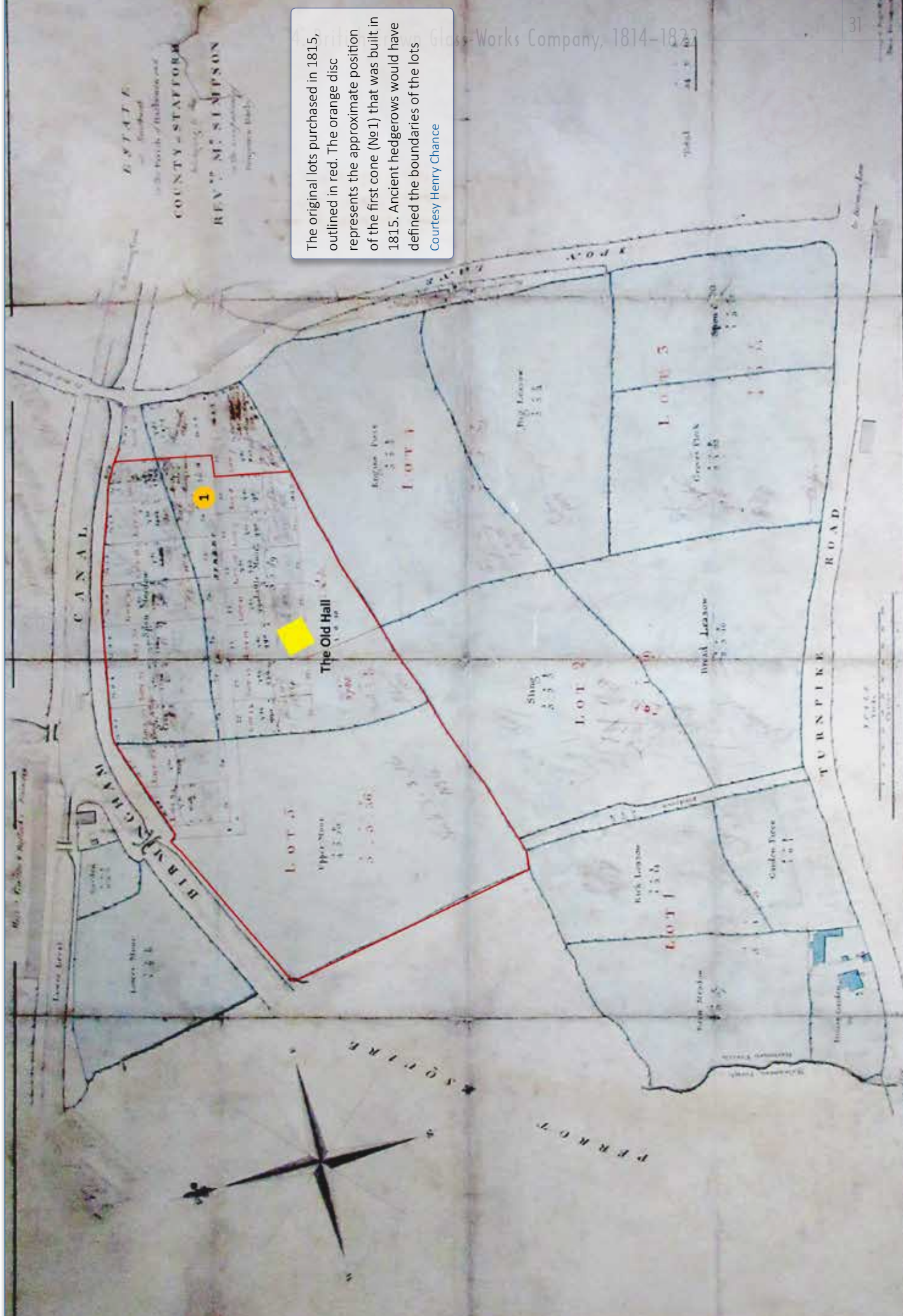
At Smethwick, near Birmingham, aged 59, Thomas Shutt, Esq. who established the only manufactory of window glass in that part of the kingdom.



Signatories to the 1816 Copartnership agreement

Courtesy Jamie B





The original lots purchased in 1815, outlined in red. The orange disc represents the approximate position of the first cone (No. 1) that was built in 1815. Ancient hedgerows would have defined the boundaries of the lots
Courtesy Henry Chance

Glass-Works Company, 1814-1822

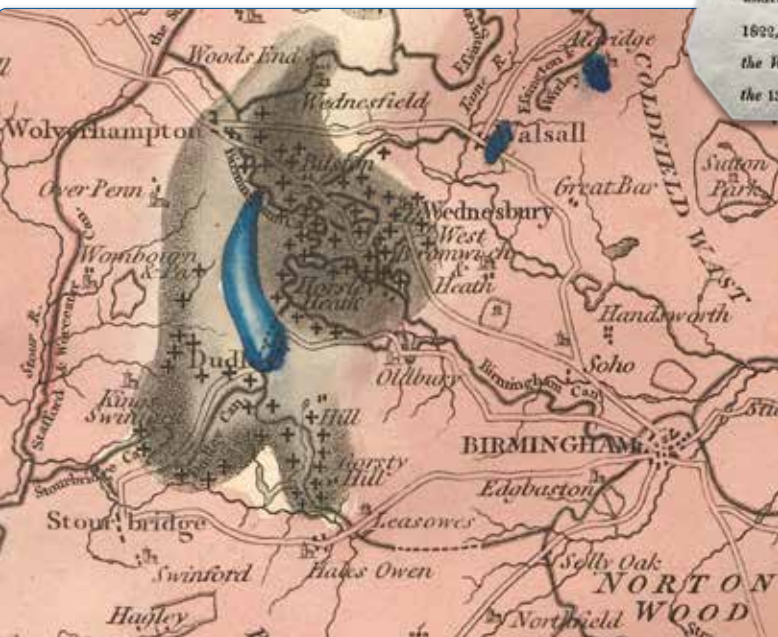
The partnership of Shutt and the other partners was formally dissolved on 17th October 1822⁷⁸ – the day of Shutt's passing – and soon after this, Joseph Stock and Thomas Palmer, as appointed Executors, disposed of the assets. This culminated in the sale of the business on fifteen acres (60,700m²) of land on what was known as Blakeley's Farm to Lucas Chance for £24,000 [£2.52mn] in November 1822. The enterprise that eventually employed upwards of 3,500 people began trading on the Spon Lane site.

The sale price is shown as being £10,000 more than the capital value of the company in 1816. This is probably explained by the success of the venture, although Lucas' eagerness to purchase it might be contributory.

It was fortuitous that the sale came at a time when Lucas was probably seeking a way in which to capitalise not just on supplying the glass, but also manufacturing it as well. If not, then he was probably inspired by the idea. This *modus operandi*, where he aspired to have total control over all aspects of the operation and not beholden to other external factors, was repeated at other times in the future. Need sand, alkali, clay or coal? Then buy or build a sand mine, alkali works, clay pit and coal mine.

The freehold to the land, however, remained with Joseph Stock and was later purchased by Lucas in 1824. The original Indenture positively dates this contract to 'the eighteenth day of May in the year of our Lord One thousand Eight hundred and Twenty four'.⁷⁹

The coal seams of the Black Country, 1815.



Between Shutt's death and Lucas acquiring the Works, the glass house almost certainly continued functioning under the direction of the remaining partnership as a going concern. There would have been little point in letting the furnace lie idle, due to the damage that a cooled furnace could experience when reheated and when glass could still be produced profitably.

1822, NOT 1824

Despite the excellent work by J. F. Chance in his *History of Chance Brothers*, there has been confusion relating to the date from which Lucas Chance took over the works.

The presumed foundation date of 1824 was actually the year in which Lucas Chance purchased the freehold of the Spon Lane site

This is addressed from a speech of thanks given by Lucas for a testimonial in September 1860:⁸⁰

It was in 1822 that I purchased the single glass-house which then constituted the whole of the Spon Lane Glass Works ...

... and is further reinforced by a typeset letter from Joseph Stock to Lucas Chance, where it states:⁸¹

... the Firm of the British Crown Glass Works Company, was, on the 17th day of October, 1822, dissolved, and the business is now carried on by R. Lucas Chance, Esq. who purchased the Works.

I do hereby give you Notice that the Partnership which subsisted between the late Mr. Thomas Shutt and Phillip Palmer, carried on at Smethwick, in the County of Stafford, under the Firm of the British Crown Glass Works Company, was, on the 17th day of October, 1822, dissolved, and the Business is now carried on by R. Lucas Chance, Esq. who purchased the Works. The Advertisement of Dissolution appeared in the London Gazette, on Saturday, the 13th day of November instant, and is signed by the said Phillip Palmer, and Myself as

Courtesy Jamie B



The blue plaque placed on the old school building signifies the correct foundation date

THE OLD HALL, 1815–1919

Although it was originally called “The House”, before long this large building became known as “The Hall” and later, “The Old Hall”. Although the exact date of the building is unknown in all likelihood it was built for Shutt between 1814 and 1822; J. F. Chance states that The Hall at the time Lucas purchased the Works was ‘a new mansion with kitchen and flower gardens’.⁸² On the original 1811 survey map, the building is not shown.

The Hall was situated just inside what was later referred to as the South Side of Chance Brothers, even though the original works did not extend that far. Once the Low-Level canal was cut between 1836 and 1838, a bridge was constructed in 1828 to provide access between the North and South sides. The bridge was named Hartley Bridge, after John Hartley Snr. who, as part of his remuneration, resided at the Hall until he died in 1833.

The next resident was John Hartley’s elder son, James, who lived there until he left in 1836, when William Withers, the Superintendent of Sheet Glass, was allotted half of the space, with the other half shared by the partners. Shortly afterwards, James Timmins Chance took up a post and he was granted a library, sitting room and a bedroom in the Hall, along with a servant. While he resided there, James often passed the night monitoring the furnaces.^{82a}

The Birmingham to Wolverhampton to Stour Valley railway line was built alongside the Low-Level Birmingham canal, and the first engine ran on 5th February 1849. This caused some alterations to the Hall as a road was needed to run under the railway line and join the North and South sides of the Works.

By 1848, the partners relinquished their tenancy of the Hall and Henry Badger, the Manager of the Ornamental Department, took up residence. In 1854, Principal Manager, Edward Forster occupied the portion of the house previously occupied by Withers. Later, the Works’ surgeon, Davis, lived there.

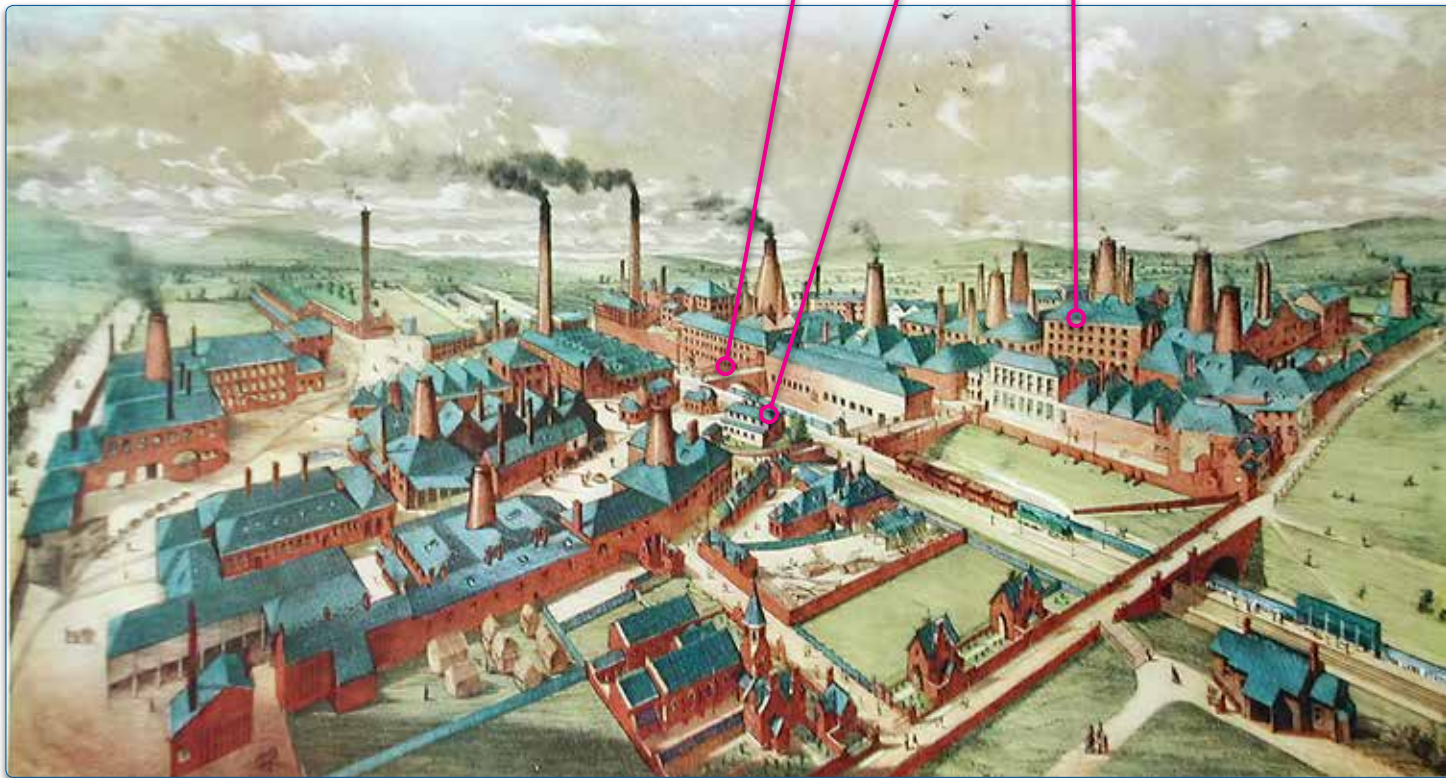
By around 1900, the Hall served a variety of purposes: Arthur H. Lynn was employed to make improvements to the Optical Department that took over two of the bedrooms as an office and a laboratory.

Before World War I broke out, the ground floor was used as an office for Henry Talbot, Principal Manager, offices for Mixing and Internal Transport, and a kitchen and dining room for Managers. The first floor was unoccupied, but following 1919 alterations were made to provide a drawing office for several departments, along with a small ‘ambulance room’ for first-aid purposes.⁸³

The second bridge that spanned the railway line, came later. This bridge crossed over the canal, and under the railway lines, emerging close to the Old Hall on the South Side.

The old Birmingham canal bordering the north side of the Works prevented any future expansion northwards.

The location of The Hall, from the 1857 aerial view
Hartley Bridge The Seven Storey building





CHANCE IRON FACTORS, 1818–1823

As new partnerships were forged, so the name of the company gradually evolved. Lucas was preoccupied with his London venture, while Edward and George Chance went into partnership with their father at the iron factoring business. By 1817, the name of the company was Chance, Sons & Crane, once George Crane was bought into the partnership.⁸⁴ It is possible that Crane was distantly related through Mary Tilt's daughter.

By November 1823, the existing partnership for the Factoring business was dissolved between William (IV), Lucas Chance, Edward Chance and Crane.⁸⁵ This was probably when Lucas extricated himself from the family business to raise capital for financing the glassworks at Spon Lane. The partnership in the iron factor business was then reformed.

At this time, William Chance (V) may still have been in partnership with his father as an earlier 1818 entry into the *Staffordshire General & Commercial Directory* shows two firms:⁸⁶

Chance W. & G., Great Charles Street
Chance W. & Sons, Bread Street

Both streets were in close proximity. It is assumed the first entry is William (V) and George, indicating the second factoring business, whilst the second entry is William (IV) with "Sons"; William (V), Edward, George and Lucas.

NAILSEA GLASSWORKS, 1821

The fortunes of Nailsea tended to fluctuate throughout its period of activity, but the total capital of the company rose from £60,000 [£4.56mn] in 1807 when the partnership between Lucas, Coathupe, Homer and William Chance (IV) had been renewed. The company was valued at £72,000 [£6.54mn] in 1821.⁸⁷ Compared to the purchase price of £24,000 [£2.52mn] for the British Crown Glass Co. in 1822, then it is evident that the Nailsea concern was larger and had greater assets.

At the expiration of the partnership on 31st March 1821, when William (IV) sold his remaining shares in Nailsea to William Coathupe, the Chance family severed its connections with Nailsea. The glassworks continued under the partnership of John Lucas (28 shares, until 1828), Edward Homer (two shares, until 1825), his son John Homer (five shares), and William Coathupe (25 shares).⁸⁸

At the same time, John Hartley's services were secured for another seven years. His reputation was sufficient for him to retain the post of manager with an annual salary of £300 [£31,539], a free house with a paddock, and coals and candles paid for. Critically, he also received two-sixtieth (3.33%) of net gains, but only on completing the contract term (see p.25). This was pertinent as these funds probably gave Hartley the means to buy into the British Crown Glass Co. in 1828 (see p.48), when his contract with Nailsea expired.

Summerfield House, dating from the late 17th century, stood between the Dudley Road, City Road and Icknield Port Road.



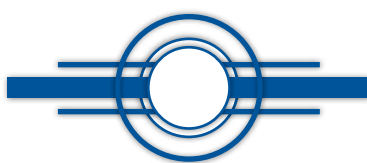


Section 1: Endnotes

- 1 Birmingham Journal, 29 January 1848
- 2 BankofEngland.co.uk/monetary-policy/inflation/inflation-calculator
- 3 CostofLiving.uk
- 4 HistoricalStatistics.org
- 5 MeasuringWorth.com
- 6 SamuelJohnson.com
- 7 Chance of Bromsgrove and Birmingham, JFC, 1892, Witherby & Co.
- 8 Definitely not the last time this pun will be used
- 9 Chance of Bromsgrove and Birmingham, JFC, 1892, Witherby & Co.; The Battle Abbey Roll, Duchess of Cleveland, 1889, John Murray
- 10 A Dictionary of English and Welsh Surnames, Charles Wareing Endell Bardsley, 1901, Henry Frowde
- 11 Wikipedia.org
- 12 Chance of Bromsgrove and Birmingham, JFC
- 13 OpenDomesday.org
- 14 Ibid
- 15 Ibid
- 16 Ibid
- 17 Chance of Bromsgrove and Birmingham, JFC, 1892, Witherby & Co.
- 18 Chance of Bromsgrove and Birmingham, JFC, 1892, Witherby & Co.
- 19 Register of Duties Paid for Apprentices' Indentures, 1710–1811
- 20 Forebears.io
- 21 Chance of Bromsgrove and Birmingham, JFC, 1892, Witherby & Co.
- 21a RevolutionaryPlayers.org.uk
- 22 From Georgian Traders to Victorian Manufacturers, Robert Johnstone, 2016, M.Sc Thesis
- 23 SlaveVoyages.org
- 24 From Georgian Traders to Victorian Manufacturers, Robert Johnstone, 2016, M.Sc Thesis
- 24a CRL
- 25 Henry Chance, email, 12th January 2018
- 26 Sandwell Archives; RevolutionaryPlayers.org.uk
- 27 SashWindowSpecialist.com
- 28 A History of Glassmaking in London (2nd Edition), p.138–139, David C, Watts, 2014
- 29 Ibid
- 30 SashWindowSpecialist.com
- 30a Gardner's Cabinet Cyclopaedia, p.17; George Richardson Porter; 1832; Longman, Rees, Orme, Brown, and Green
- 31 The Nailsea Glassworks, Margaret Thomas, p.2, 1987, H. G. & M. A. Thomas
- 32 Pastscape.org.uk; thanks to Tim Richards
- 33 Verre-Histoire.org
- 34 Ibid
- 35 The Nailsea Glassworks, Margaret Thomas, p.2, 1987, H. G. & M. A. Thomas
- 36 Ibid
- 37 Nailsea Glass, Keith Vincent, 1975, David & Charles
- 38 NailseaTown.com/history/; The History of Coate's Cider Company, Paul Townsend, www.flickr.com
- 39 The Nailsea Glassworks, p.9, Margaret Thomas, 1987
- 40 Ibid, p.10
- 41 RevolutionaryPlayers.org.uk
- 42 According to Henry Chance
- 43 Rootsweb.com, Dave Ogden (possibly the private diary?)
- 44 Bristol Mirror, 4th June 1814
- 45 Ibid, 1st April 1815
- 46 PG>R, Sir Hugh Chance article, January 1958
- 47 The Nailsea Glassworks, pp.24, 26, 27, Margaret Thomas, 1987
- 47a Ibid, p.27
- 48 Ibid
- 49 Ivo Haanstra
- 50 An Illustrated Dictionary of Glass, Harold Newman, 1977, Thames & Hudson
- 51 London Courier & Evening Gazette, 11th May 1813
- 52 Manchester Mercury, 4th November 1817
- 53 Birmingham Chronicle, 12th October 1820
- 54 Ibid, 23rd May 1822
- 55 Ibid, 26th May 1825
- 56 Yorkshire Gazette, 11th October 1823
- 57 Worcester Journal, 8 April 1819
- 58 Scotland's Glass: 400 Years of Glassmaking, Shiona Airlie and Brian J. R. Blench, 2009, Cortex Design
- 59 JFC, p.1
- 60 Ibid, p.280
- 61 R. L. Chance, private account book, 1821–1831; transcribed by Sir Hugh Chance
- 62 The Times, 6th December 1817
- 63 R. L. Chance, private account book, 1821–1831; transcribed by Sir Hugh Chance
- 64 London Gazette, 31st August 1822
- 65 www.edpopehistory.co.uk, Crabb Robinson Diary
- 66 Ibid
- 66 Ibid
- 67 Morning Post, 15th April 1826
- 68 *Brewer's Britain and Ireland*, John Ayto & Ian Crofton, 2005, Weidenfeld & Nicholson,
- 69 SmethwickLocalHistory.co.uk
- 70 Domesday Book © Editions Alecto (Domesday) Ltd, 1992, Penguin Books, 2002
- 71 SmethwickOldChurch.org.uk
- 72 A Description of Modern Birmingham, 1818
- 72a Walks in the Black Country, Elihu Burritt
- 72b Express & Star, 11th March 2020
- 72c 35.64 acres as calculated by the author, taking into account the canal, railway line and footpaths
- 73 British-History.ac.uk
- 74 Wikipedia.org
- 75 WikiTree.com
- 76 JFC, p.2
- 77 Cambridge Chronicle and Journal, 1st November 1822
- 78 Aris's Birmingham Gazette, 22nd November 1824
- 79 Original Indenture, possession of Jamie B
- 80 A History of the County of Stafford: Volume 17, Offlow Hundred (Part), A. P. Baggs, G. C. Baugh and D. A. Johnston, 1976, Victoria County History, London [footnote 145]; British-History.ac.uk
- 81 n/a
- 82 JFC, p.2
- 82a JFC, pp.35–36
- 83 CC, Nov. 1949, p.22; JFC, p.2,
- 84 Summary of ledger, Sir Hugh Chance, 1975
- 85 London Gazette, 3rd November 1823
- 86 Staffordshire General & Commercial Directory, Part 3, p.1839, dated 1818
- 87 Nailsea, p.10, Margaret Thomas, 1987
- 88 Ibid
- 89 billdargue.jimdo.com



SECTION 2



1822-1836



5 British Crown Glass Co., 1822–1834

Thus was the first artificer in glass employed, though without his own knowledge or expectation. He was facilitating and prolonging the enjoyment of light, enlarging the avenues of science, and conferring the highest and most lasting pleasures; he was enabling the student to contemplate nature, and the beauty to behold herself.

—Samuel Johnson, Rambler N^o 9, 17th April 1750¹

On acquiring the Works, the excitement that filled Lucas as he set forth in this new venture was palpable. He relayed a letter to his brother Henry, now a Barrister:²

I have every reason for thinking that the concern will realise the most sanguine expectations I have form'd, and it presents a scope for the exercise of my acquirements as a man of business

Communication over the years between Lucas and Henry was prolific.

THE FINANCES, 1822–1846

The total of £24,000 agreed for the purchase of British Crown Glass Co. (see p.32) was paid to Joseph Stock for £15,000 [£1.58mn] and to the Palmer Brothers for £9,000 [£946,191], indicating a five-eighths to three-eighths split respectively. The Palmers were paid nine instalments of £1,000 [£105,132] between November 1822 and February 1825, therefore making equal payments every three months. The enterprise that eventually employed upwards of 3,500 people began trading on the Spon Lane site in 1822.

The funding for the purchase in part appears to have derived from his father, William (IV), his brother Henry and his uncle Edward Homer. The latter was still a partner of Nailsea and remained one until his death in 1825.³

REPAYMENT OF PURCHASE

The repayments to Stock were slightly more complex and took place over five years; £9,000 with interest by instalments, as follows:

Date	Amount
July 1823	1,500
July 1825	1,500
1826	2,000
August 1827	4,000

Interest over this period amounted to £3,280 12s 2d [£344,834].

By 1831, an account shows, 'Joseph Stock with R. L. C.' where it states 'Transferred to Chance brothers & Co. who paid off mortgage £7,937 13s 3d [£681,328] plus interest £357 15s [£30,731]' with an accompanying note, 'Mr Stock does not want any further sum to be paid'. It is assumed that the settlement of the mortgage was due to William Chance stepping in as a partner following the Badams affair (see p.54).

Another interesting point is the mention of 'Chance brothers & Co.' indicated the Firm may have stylised itself as such, between William stepping in with funding (1831), and the formation of Chances & Hartleys (1834).

By 1834, Stock was paid a further £569 18s 3d [£61,303] and much later £3,500 [£352,1037] each in both 1845 and 1846 that appears to have liquidated the debt.⁴

SALES, DUTY & PROFIT

The growth of the Company from November 1822 until March 1829 was rapid, but equally, the amounts paid in excise duty were eye-watering and profits were relatively meagre because of this. In fact, the glass merchant business was earning far more money for Lucas than the glass manufactory; for example, in 1822 the mercantile business showed a profit of £3,446 [£362,286] and it was not until 1829, by which time John Hartley made his mark, that the glass manufactory started showing a meaningful profit.⁵

After a second cone was built in 1824, the resultant sales and duty more than doubled, although the level of profit only increased marginally. The losses experienced from August 1827 to March 1828 coincided with the termination of John Hartley's contract with Nailsea and Lucas's success in enticing him to Spon Lane. Additionally, once a third cone was built in 1828, this accounted for the large increase in sales, duty and profit for 1829*.⁶

Date	£ Sales	£ Duty	Net profit	Interest
May 1823	18,372	11,946	1,209	644
Oct. 1823	20,055	12,935	1,911	563
Sep. 1824	44,897	30,739	1,966	1,406
Oct. 1825	56,998	38,409	1,805	1,718
Jan. 1827	76,963	49,324	2,332	2,574
Aug. 1827	25,886	17,191	-1,388	1,306
Mar. 1828	38,799	26,090	-394	1,436
Mar. 1829	*75,632	48,266	3,928	3,246

TAXES & DUTIES

Lucas had courage and foresight, as he took over the British Crown Glass-Works Co. at a time when all British glassmakers were suffering from government-imposed taxes, duties, and restrictions. This is exemplified by the total amount of excise duty paid of £234,900 [£18.2mn] from the inception of the company until the 31st March 1829 (see Sales, Duty & Profit).

Not only was the window tax in force at this time but excise officers were also employed – at the expense of the company – to stand day and night over each pot, being overseen by an inspector whose sole purpose was to ensure the officers themselves were not bribed to allow any glass through untaxed. Whether the inspector himself was ever bribed is debatable, but all these men were paid by the glass company so it is conceivable this practice happened. For the British Crown Glass-Works Co. this meant four inspectors for the single furnace. Not only were the pots watched, but also the thickness of the glass was regulated: glassmakers were not allowed to produce glass thicker than 24oz (approximately three-sixteenths of an inch, or 5 mm), thus inhibiting the manufacture of optical glass lenses.

Even though this new venture took up a great deal of his time, Lucas and his family still lived in London where he was listed as a window-glass merchant based at St Paul's Wharf, 25 Upper Thames Street, close to Southwark Bridge,⁷ with his residence in Highgate. Inevitably he travelled regularly by stagecoach between London and Birmingham (see p.44).



A satirical cartoon from 1794, painting a damning picture of the taxes imposed on people and businesses. The tax collector is saying, 'I am come again about the Taxes, Sir – if agreeable to you to discharge them'

THE ESSENTIAL INGREDIENTS FOR GLASSMAKING

Several minerals are required to ensure a quality glass, but two are essential. Sand, or silica, mixed with an alkali are the most important ingredients.

SAND

The sand that the Company used for making glass was, until 1835, transported from the Isle of Wight. It proved to be an expensive commodity when using sea, road and canal to reach its destination. Fortunately, a new supply was found much closer to home near Leighton Buzzard (originally called Leighton Beau Desert) between Bletchley and Dunstable in Bedfordshire in an area called Heath and Reach. This sand proved a worthy replacement and a five-year contract commenced in 1835. The land was then purchased in 1842 and a sand mine was created there. Conveniently, the mine was only three miles from Leighton Buzzard railway station on the main Birmingham to London line, although the sand itself might have been shipped to Spon Lane using the nearby Grand Union Canal – less than two miles from Heath & Reach – that connected Birmingham to London.

The sand pits at Heath & Reach in 1826, before they were “inclosed”. Even today, the sand pits are easily seen on aerial maps

Courtesy Bedfordshire Council



From 1830, improvements in all types of window glass were detailed in Henry Chance's (1828–1901; James Timmins' younger brother) contribution to Samuel Timmins' book, *Birmingham and the Midland Hardware District*.¹¹ These included:

- Substituting carbonate of soda in the place of kelp, to aid the melting of the glass
- Improvements in size, colour and quality of the glass
- Using a diamond to split the cylinders of sheet glass. This replaced the use of a red-hot iron.

"Colour" in this context meant attempting to achieve the clearest possible glass, i.e. removing or reducing any impurities that introduced colour. Similarly, the terms used much later were "white" and "extra-white" to define high-quality and best-quality colourless optical glass.

N. Hudson Moore's book, *Old Glass: European and American*, suggests that both Georges Bontemps and Henry Chance were aware of the superiority of the sand from Plymouth Beach, Massachusetts, USA.¹² This sand had been experimented with by one of the leading Stourbridge glass makers, the firm of Thomas Webb, to great success and the results had been exhibited at 'London in 1851' so presumably at the International Exhibition of that year.¹³ The greater expense of importing the sand for a utilitarian purpose probably dissuaded Chance Brothers from pursuing this course.

THE IMPORTANCE OF ALKALI

Alkali – soda ash or sodium carbonate (Na_2CO_3), alternatively sodium sulphate (Na_2SO_4 ; aka salt cake) – is an important ingredient because it permits a much lower melting point. Pure silica or quartz melts at a temperature of 1,723° Centigrade, but adding an alkali (a flux) enables the glass mix to melt at about 1,200° Centigrade. For simpler processes and where high quality was not essential, like window glass, this was a bonus and the cost-saving in fuel was vast. Earlier glasshouses used the ashes of burnt kelp (seaweed) to create the alkaline soda ash, and some Scottish villages became dependent on this industry. Kelp, however, was abandoned by Chances & Hartleys in about 1835, in favour of manufactured sodium carbonate and sodium sulphate.¹⁴

A further development by Charles Attwood, used a combination of kelp ash and manufactured soda that was patented in 1817 for a period of fourteen years. By not specifying the amounts for each substance, Attwood avoided his patent being quickly superceded:^{14a}

... I do declare that I have found the addition of the crystalised carbonate of soda in proper proportions to the other materials according to the circumstances, a very convenient and effectual mode of administering such additions of alkaline of saline matter ...

Once the patent had expired in 1831, other glass manufacturers quickly adopted the process, including Lucas Chance who improved the process by replacing kelp altogether. For British Crown Glass-Works Co. this was the embryo of a major alkali industry.

Prior to this, in April 1828, Lucas purchased his soda from the Jarrow Alkali Co., operated by Isaac Cookson (of the glassworks) along with William Cuthbert. Such was the size of Lucas's purchases that he spent a total of £1,215 [£109,312] by the end of the year, with subsequent years as follows:^{14b}

Year	Amount	[£ in 2023]
1829	1,850	160,745
1830	1,528	138,131
1831	1,548	127,100

Due to the rapid deforestation caused by wood burning to produce the alkali from kelp, in 1775 the French Academy of Sciences offered a prize to anyone who could create a suitable replacement from ordinary sea salt. By 1791 Nicolas Leblanc (1742–1806) succeeded in this task but, due to the intervention of the French Revolution, the prize money was withheld.¹⁵ This process was a means to create sodium sulphate from sodium chloride (salt), which not only benefitted the glass industry but also soap and paper manufacturers. From the early 19th century, and once the Leblanc process had been commercialised, the kelp process became redundant.



The alkali at Spon Lane was originally made on-site, but in 1834 this side of the business was transferred to new works in Oldbury, Worcestershire (see p.83). Although the manufacture of salt cake never worked well, making chemicals in bulk was proven as a venture, and the alkali works eventually became the largest of its kind in the Midlands. For nearly 60 years it was inexorably linked with Chance Brothers before becoming an independent company, the Oldbury Alkali Company Ltd in 1890, although still controlled by the Chance family.

OPAL & OPALINE GLASS

Apart from the inevitable sand and coal, one other mineral, which transformed British glassmaking from the early 17th century was bone-ash. It was used as a “flux”, which aided the melting and fusion of the silica, and could also be used to create opal (white or milk) glass, and in lesser quantities resulted in a more translucent opaline glass. *The Hull Packet and Humber Mercury*, of 11th October 1831 reveals that the Company was importing cattle bones from continental Europe:¹⁶

Courtesy of BL

Chance, Hartley, Ostend, 1378—60 tons cattle bones.

While the use of bone ash is primarily used to create opal and opaline glass, there is no evidence that the British Crown Glass-Works Co. was using it for this purpose; its main priority was most certainly window glass. Exactly why the company was importing such quantities of animal bones is unknown, but it may have been to use as a flux, or to create opal and opaline glasses for the fledgling Ornamental Department (see Volume 2).

A decorative fish jug in opal glass, made by William Henry Heppell with a registered design dating it to 1882

GLASSMAKERS' INITIATION: PRINCE RUPERT'S DROP

The practice of initiating apprentices in any engineering firm has been established as long ago as the Industrial Revolution. Initiation rites abound in virtually all industries and were transferred from company to company as workers relocated looking for better employment.

These initiation processes ranged from the innocuous, 'go to the stores and ask for a "long weight"', where the storekeeper, having experienced such ribaldry before, made sure the hapless youth endured a "long wait". Other rituals could be cruel, dangerous, or degrading. These practices were carried out by long-established workers who in turn had themselves endured the very same rituals when apprentices themselves.

At Chance Brothers, one initiation for apprentice glassworkers was the use of a "Prince Rupert's Drop". When this practice started is unknown, but it was still being carried out after World War II.¹⁷

The "Drops" were like glass tadpoles that were created by dropping a small gob of molten glass into a bucket of water, which had the effect of annealing the outside to a high degree making it extremely tough – so hard was the surface that the tadpoles could be hit with a hammer without even a scratch. This was the basis for toughened glass. As far as the victim was concerned having the glass tadpole placed in his clenched hand seemed harmless. However, once the immediate top of the tail is snapped off, the glass shatters into tiny fragments with such force that the unfortunate victim experiences pain. It is described in one old journal, 'So is a kingdom One and Strong; but when the top is broken shivers into men'.

An early account of the Prince Rupert's Drop phenomenon. Source unknown.



These "hand-crackers" were described in *The Saturday Magazine*, in October 1833. They were:

... found in every toyshop, is a very familiar instance of this property: the thick end of this may be laid on the table, and struck forcibly with the fist without danger, but if it is grasped in the hand, and the smallest portion of the thin end is broken off, the whole of it breaks to pieces or bursts, with so much violence as to sting slightly the hand that holds it.

Incredibly, it appears these drops were sold to children for fun.

The name's derivation was taken from Prince Rupert (1619–1682) and may have been introduced by him from Germany to the court of the newly-crowned King Charles II (1630–1685) in September 1660. Charles II sent samples to the Royal Society for examination in March 1661 and Sir Robert Moray (c.1607–1673) reported his findings at a meeting on 14 August 1661.¹⁸

Samuel Pepys wrote about the phenomenon in his Diary, dated 13th January 1662 as did Christopher Merret, in his translation of Antonio Meri's *L'Arte Verraria* (*The Art of Glass*). Neri's description of the 'Glassdrops' was extensive and covered ten pages in his book.

A description of the Prince Rupert's Drops is provided in *The Principles of Glassmaking* by Harry Powell of Whitefriars Glass:¹⁹

When a small quantity of glass is gathered from the crucible on an iron rod, and a drop is allowed to fall from the iron into boiling water, and is removed from the water as speedily as possible, it is found to possess curious properties. The shape of the drop, as shown at a, fig. 1, is that of a tear with a long tail. The head of the tear is exceedingly hard, and resists a heavy blow without fracture; it also can scarcely be marked by file or diamond. If, however, the tail be fractured by a sudden blow, by pliers, or by the corrosion of hydric fluoride, the entire mass will be disintegrated, as shown in b, c, d, and may be crumbled in the hand without injury.

This, however, conflicts with the actual experiences of apprentices such as Ray Drury (b.1933) who affirmed that a certain amount of pain was felt in the hand when the tail of the Drop was broken off.

R L CHANCE & COMPANY, 1822-1828

Lucas's glass mercantile business in London thrived during the years, although a reduced profit and increased interest was evident in 1823† that can almost certainly be ascribed to the purchase of British Crown Glass in the previous year.

Successive net profits were as follows:

Year	£ Net	£ in 2023	£ Interest
1822	3,446	346,520	206
1823†	1,535	144,606	1,037
1824	3,151	273,788	769
1825	9,141	676,101	—

Following this was a 2¼-year period from 1st January 1826 to 31st March 1828 that showed an accumulated net profit of £14,574 [£1.27 mn].

The London directories at around this time gave the business premises as:²⁰

**R. L. Chance & Co., Crown Glass Merchants,
2 Coleman Street Buildings and 27 Wharf
City Road basin.**

According to Sir Hugh's interpretation of Lucas's private accounts, John Hartley appears to have gone into partnership with Lucas's private mercantile business when joining the British Crown Glass-Works Co.

The distance between the two sites was about 1.3 miles (2km). However, by 1838, it appears that the offices at Coleman Street were taken over by Chance Brothers, so it is presumed that before then the glass merchant business was absorbed into the Company.

In 1825, Lucas was bequeathed £8,308 [£642,447] from the estate of Edward Homer, his uncle, and on 16th July 1825:^{20a}

Committed to Stafford county gaol, Wm. Fellowes, for stealing at Harborne three one pound notes, seven sovereigns, and other monies, the property of R. L. Chance.

This suggests that Lucas may have been living in Harborne when visiting the Spon Lane works. The sum involved, at least £10 7s, is equivalent to £800 in 2023, so was not a trifling sum.

Following this, Lucas is noted in local Birmingham newspapers as making many donations to worthy causes, often up to ten guineas [£812].

This was trumped in 1828, when Lucas donated £100 [£8,997] towards the construction of a tunnel under the Thames.^{20b}

NAILSEA, 1825-1828

Following the deaths of Lucas's uncles – on one side Edward Homer in 1825; on the other John Robert Lucas in 1828 – the firm was managed by Edward's son, James Edward Homer, to be joined by John's son-in-law, Reginald Henry Bean – who later adopted the surname Rodbard – and his two sons.²¹



Reginald Bean with his family. His wife, Emma, was the daughter of John Robert Lucas. Unknown artist
Courtesy The Museum of Somerset

TRANSPORT NETWORKS

The local source of materials such as sand (the prime ingredient of glassmaking, see p.40), clay (to produce kilns and pots) and coal (as fuel), were essential – but trying to find all three within a close vicinity of each other, was difficult if not impossible.

Birmingham and the Black Country had good quality clay and coal, and Birmingham had a glassmaking history going back to 1757 when Mayer Opnaim (aka Oppenheim) advertised ‘red transparent glass is to be had... either in a light rose or a deep ruby colour’²² In nearby Stourbridge, glassmaking had been founded much earlier, in 1612 and so the precedence for glassmaking in the locality was already set.²³ Good quality sand was the only main ingredient that needed to be shipped to Spon Lane and initially British Crown Glass-Works Co. chose the site in the Isle of Wight, off the south coast of England.

From the 1760s, Birmingham was situated in the centre of a canal network and was linked with Smethwick via a branch line. The London and Birmingham Canal offered companies a route directly to and from the capital and was of natural interest to Lucas Chance. Once a provisional committee to build a canal was formed in 1836, Lucas became a founding member. Share capital of £3 mn [£232 mn] was issued.²⁴

The fledgling railway network started in 1825 with the Stockton and Darlington Railway using George Stephenson’s (1781–1848) train, was also starting to make inroads. Although steam locomotion had been invented in 1804 by Richard Trevithick (1771–1833), he was outdone in the Rainhill trials of 1829 by Robert Stephenson (1803–1859) and his Rocket locomotive, which proceeded to be used as the model for future railways.

THE JOURNEY BETWEEN BIRMINGHAM & LONDON

In 1823, a proposal was made to create a railway line between Birmingham and London, but it was not until 1833 that construction started. Amongst the first subscribers to the London & Birmingham Rail-Road Co. were Lucas and William (IV) in March 1825, while William (V) served on the Birmingham Committee.²⁵ Another subscriber was George Bacchus of the Bacchus & Green Co. glassmakers in Broad Street, Birmingham.²⁶

For Lucas, this could not come any sooner. Until 1833, when the railroad was finally opened, he was forced to use stagecoaches to travel between the two conurbations, probably using William Chaplin & Co.’s “Tally Ho” service. The journey took at least eleven hours and involved nine different stages, necessitating a change of horses each time. This contrasted with the 5½ hours in 1839 with a top speed of about 35 mph (56 kph) that the rail network offered.

Coach travel was hardly comfortable. Many of the problems were due to the rigid axis for the wheels, and the forces transferred through to the primitive springs supporting the carriage. The springs of the coach barely coped with the rough roads of the day and one “study” mentions, ‘the oscillatory motion of the Railway carriage being much more salutary than the swinging, jolting motion of the stage coach.’²⁷

Costs for the stagecoach traveller were high and whilst the wealthier patrons could afford one of the inside seats of the coach, the less privileged were forced to sit outside in all weathers. In a 1731 bill advertising the Birmingham to London stagecoach, the charge to the passenger was ‘21 shillings each passenger, and 18 shillings from Warwick’ [£202 and £173]. The weight of luggage was strictly governed to 14 lbs. (6.4 kg) per person ‘and all above to pay One Penny a Pound’ [interestingly, one penny in 1731 equals £1 in 2020].

In comparison, travelling in 1731 was expected to take two-and-a-half days, with overnight stops at the staging houses that offered food and ale to the travel-weary passengers and drivers.

The demands on Lucas’s time, travelling between London and Birmingham were made plain when he wrote on 31st January 1829 when he was forced to admit that,²⁸

Having put too much on my own shoulders I have been unable to try to balance my books from 1st January 1825 to 31st March 1828 and I have therefore contented myself with taking off the balances – and as a trial balance is made every Quarter by Mr Jackson – I shall in future have no difficulty balancing every 31st March.

A century before the Tally-Ho service, customers had to endure a 12-hour service with Nicholas Rothwell’s Stage-Coach service



BIRMINGHAM STAGE-COACH,

In Two Days and a half; begins May the
24th, 1731.

SET Sout from the Swan-Inn in Birmingham,
every Monday at fix a Clock in the Morning,
through Warwick, Banbury and Alesbury,
to the Red Lion Inn in Aldersgate Street, London,
every Wednesday Morning: And returns from
the said Red Lion Inn every Thursday Morning
at five a Clock the same Way to the Swan-Inn
in Birmingham every Saturday, at 21 Shillings
each Passenger, and 18 Shillings from Warwick,
who has liberty to carry 14 Pounds in Weight,
and all above to pay One Penny a Pound.

Perform d (if God permir)

By Nicholas Rothwell.

My error hitherto has been in analysing and refining too much – I think my books are now put on a footing that will work well.

By the time the railway line between Birmingham and London was established, a comparison of travelling by train against stagecoach was provided by a Dr Johnson with the supposed medical advantages:²⁹

The former equalises the circulation, promotes digestion, tranquilises the nerves, and often causes sound sleep during the succeeding night; the exercise of this kind of travelling being unaccompanied by that lassitude aching, and fatigue which, in weakly constitutions, is the invariable accompaniment of the ordinary coach travelling, and which so frequently in such constitutions produces sleepless nights.

Aside from the Birmingham to London route, William also served as a director for the Birmingham Board of Management for the Grand Junction Rail-Road Company. This company proposed a more far-reaching approach by building a network that eventually linked to all the major ports.³⁰ Naturally, this was of interest to William with his company shipping goods to and from Bristol. Additionally, he was also a subscriber to the Bristol Northern & Western Railway and with an interest in both companies this worked to his advantage.³¹

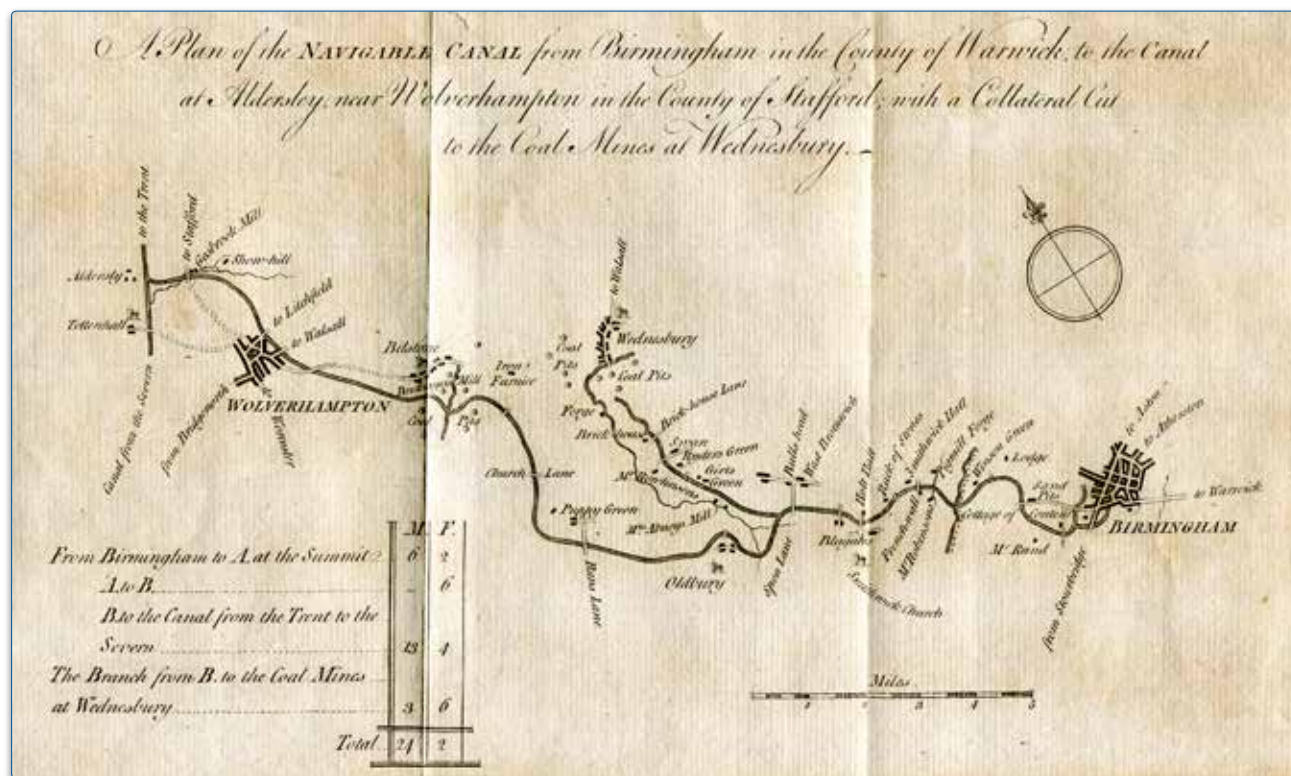
The first canal network between Birmingham and outlying towns, c.1780. Spon Lane is shown immediately before the Wednesbury branch line

RAILROADS & CANALS

The London & Birmingham Rail-Road Co. operated from 1833 until 1846 after which it became a constituent part of the London and North Western Railway (LNWR). When it opened in 1838, the 112 mile (180 km) long railway line, was the first between two major towns/cities, and once joined to the Manchester to Liverpool line, it became the backbone of Industrial England. The line was engineered by Robert Stephenson starting at Euston Station in London, then continued to Rugby where it turned west to Coventry and then to Birmingham at Curzon Street Station.

Building the L&BR line was a massive undertaking that was further complicated by objections raised by Northampton landowners, which forced the line to detour miles away from the town. Nevertheless, after five years and the blood, sweat and tears from a veritable army of 20,000 "navvies", the new railway dramatically reduced the travelling time between the newly emerging industrial town and the capital city to between five and a half to six hours (the return taking half an hour longer). As a guide, a first-class return journey between Birmingham and London cost £1 10s [£147].³²

The term navvies, often used derogatorily to describe a labourer, derives from the term navigational engineer. The work was arduous, the conditions harsh, and the accommodation was squalid. The navvies built the canal system using brute force, in a period when mechanised building aids were few or non-existent. Later, they created mounds and valleys and tunnelled their way through mountains or built bridges to ford rivers. Without these remarkable men, the industrial landscape of England would not have been transformed so quickly.





The original Work's plan is bordered in red. Lots purchased up to 1828 are bordered in green, which was compensation for when the new Birmingham canal dissected the Works.

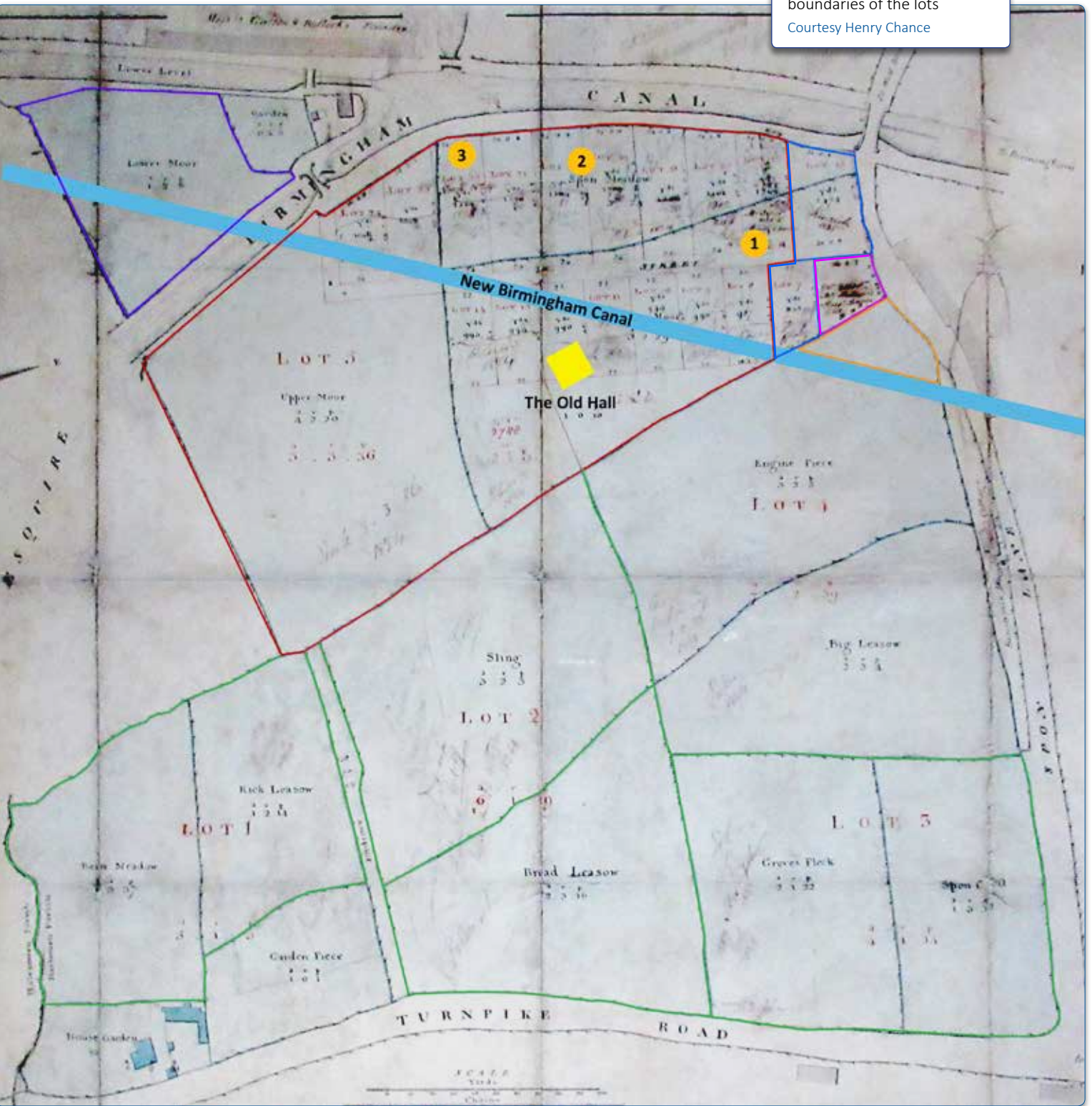
Furnaces №2 and №3 were added in 1824 and 1828 respectively.

Lots 7 and 15 (blue) were purchased 1835–1836, with the unknown plots are probably that marked in cerise.

The land known as the "Island" (top-left) is bordered in purple.

Original plan of the Spon Lane site in 1810, divided into the various auction lots. As can be seen, various plots were originally intended to be used for housing. Hedgerows almost certainly defined the boundaries of the lots

Courtesy Henry Chance



LAND ACQUISITIONS, 1828–1838

The Chance Works was originally built alongside the old Birmingham canal, which took a meandering route across the north side of the Works and probably followed an existing water course. When the decision came in 1828 to cut a new straighter canal between Birmingham and Wolverhampton, this bisected the land owned by the Company. Originally it was intended to tunnel under the works, but this was discarded in favour of a surface canal that was far cheaper to construct. Instead of compensating the Company for the loss of land, it was instead agreed to offer adjacent property – this pleased Lucas as it allowed him to expand at very little expense. Writing to his brother Henry on 2nd February 1828, Lucas was elated:

In the place of the tunnels I get Moilliet's land, N^o 1 (including the piece they reserve it cost them £1,000), Phillip's, N^o 2, with 6 cottages, which cost them £800, N^o 3, of which about 2/3rds of an acre is not to be spoil'd and which will improve the house ultimately.

Regardless of these acquisitions, it still took another ten years of legal wrangling before the final conveyance was completed on 15th May 1838.³³

The rapid growth of the glassworks (right) in the period when it became the largest glassmakers in the country. The main growth occurred after the repeal in Excise Duty in 1845

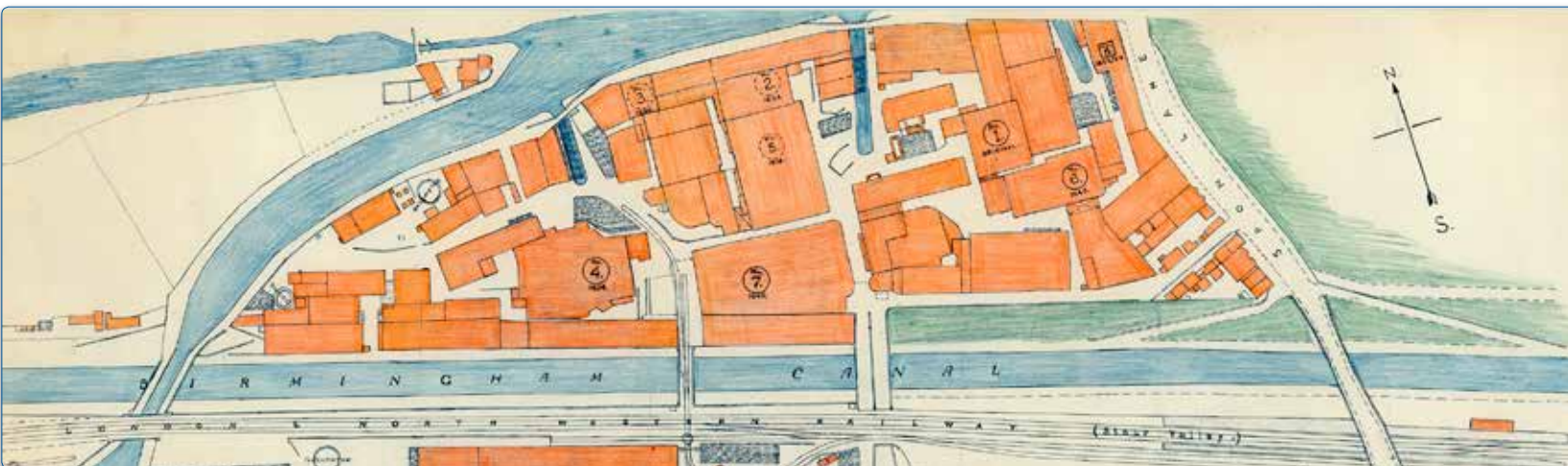
Below: A Works' Plan dated 1862, showing both upper and lower canals, the railway line and positions of the first eight furnaces on the North side
Courtesy Sir Sebastian Chance and CHT

More land was acquired in 1835 and 1836 amounting to two-thirds of an acre. One of these purchases, Archibald Kenrick's, moved the boundary of the works towards Spon Lane. The purchases were detailed as follows:

Archibald Kenrick	Lot 15; 1,475 yds ²	£221 5s
George Neale	Lot 7; 853 yds ² with five cottages	£530
Daniel Pearsall	580 yds ² (unknown area)	£85 19s
John Calloway & others	330 yds ² (unknown area)	£370

This total (£1,207 4s [£114,096]) included the "Island", which was a strip of land at the northern part of the Works, west to the original boundary and named as such as it was entirely bordered by the two canals. However, the Island was largely inaccessible from the main part of the Works and was left virtually undeveloped. By December 1838, a tunnel was proposed that was made under N^o 1 Furnace, and which terminated at Kenrick's land.³⁴

Year	Furnace N ^o	
1814	1	British Crown Glass Co.
1824	2	
1828	3	
1834	4	Chances & Hartleys
1838	5	Chance Brothers
1845	6, 7	
1852–1854	8 to 12	





MISSING BILLS, 1827

In the early part of the nineteenth-century money orders were commonly used to conduct business. In an advert posted in the *Birmingham Chronicle* in 1827, a warning was issued about a letter containing several bills, addressed to Edward Chance, which had been mislaid. The amount of money involved was massive: fourteen bills amounting to £747 [£65,322] over a two-month period. This amount may have been money owed to the business, as both Edward's brothers, Lucas and William, were involved.

Another piece of misfortune was imposed upon a William Chance (possibly a relative to the glassmakers) of Woffall in Worcestershire when he was declared bankrupt on 29th May 1827. Strikingly, his profession was noted as a glove manufacturer, which was closely affiliated to the occupation of cordwainer that first established the Chance family.³⁵

JOHN HARTLEY, 1828

Lucas realised that help was required for the glassworks to improve, and once again he turned his attention to the man he had secured for the Nailsea works, John Hartley (see p.48). Lucas already knew that Hartley's contract with Nailsea was due to expire in April 1828,³⁶ and Lucas's persuasive nature was again evident as it is apparent that Hartley had already agreed on a move to Smethwick in July 1827, judging from a letter written to his brother Henry. Lucas wrote succinctly: *'I really see no reason for their being angry, excepting that they have lent me their pot maker, but then any other house would have done the same'*.

The distinction between a pot maker and one of the country's leading crown glassmakers was not lost on Nailsea. Not only had Lucas Chance set up in competition with his uncle at Nailsea, Robert Lucas, but he contrived to spirit away their best crown glass worker. This instance was enough for Robert Lucas to stipulate in his will that Lucas Chance did not benefit from any monies he willed to Lucas Chance's mother (Robert Lucas's sister).³⁷

After securing Hartley's services, in another letter to Henry, Lucas wrote: *'I could not resist the temptation of giving you information that I am sure you will rejoice at'* and that he saw great promise from *'one year's good management at Smethwick under Hartley'*.³⁸

Hartley provided the capital of £4,000 [£359,876] and received an annual salary of £400 [£35,988], *'a house, coals, &c.'* together with a fifteenth share of the profits, with profits being limited to £50 [£4,498] per share to a maximum of £3,000 [£269,907].³⁹

Although it is suggested that John Hartley may have entered into a partnership with Lucas, there is no evidence to support this, although it is shown that he did accrue shares in the Company. According to J. F. Chance,

a partnership with John Hartley was envisaged but never formalised and it was not until after his death that his sons became partners.⁴⁰

Hartley's eldest son James joined to assist in the management and later John's younger son, also named John, worked at Spon Lane. As part of John Snr's remuneration, he and his family took up residence in The Hall. Apart from two sons, the elder Hartley also had two daughters, and one (Margaret) eventually married William Kirk of Sunderland.⁴¹ This may be significant given that the Hartley brothers later set up their glass manufactory at nearby Tyneside.

To Henry Chance, Lucas wrote contentedly of his working relationship with Hartley that he was: *'... perfectly satisfied, and as he places the most implicit confidence in me, the engagement is in every respect everything I wish'*.

But perhaps the most prophetic words were penned to his brother:

I have so often been disappointed that I dare not calculate on anything, but the probabilities are, that I shall establish on a solid basis a manufactory that will be a credit to the family, and perhaps the neighbourhood, with an income sufficient to make all my sons glass manufacturers.

Lucas Chance's hopes and foresight were prescient, as both his and brother William's sons in due course became involved with an increasingly successful company; the style of the British Crown Glass-Works Co. being initially retained. It is highly likely that the production of crown glass under John Hartley's management improved considerably.

According to *The History, Topography and Directory of Warwickshire*, published in 1830, the company was still registered as *'British Crown Glass Company, Smethwick, Hartley Manager'*, showing that the company name had not changed after Hartley had bought into the company. However, the company was named *'Messrs. Chance and Hartley'* by *Aris's* newspaper, 27th September 1830.

In the never-ending quest to improve production and seeking details of the elusive sheet glass process, Lucas travelled to France in 1830. One London glass merchant and a close friend of Lucas, Antoine-François-Jean Claudet (1797–1867), who imported French sheet glass and shades to England, arranged for Lucas to visit the glass factory of Georges Bontemps (1799–1883; the name translates to "good time"), the director of the eminent French glass manufacturer based at Choisy-le-Roi, Paris. For many years, Claudet had been the agent in London for Choisy-le-Roi glass and, from 1815, was already acquainted with Lucas when the latter was based in London and sourcing French sheet glass.

French Influences

ANTOINE-FRANÇOIS-JEAN CLAUDET

Antoine-François-Jean Claudet (1797–1867) was born in Lyon to a wealthy French family. One of his uncles, Msr Vital Roux, a banker, sent the young Antoine to work at the Choisy-le-Roi glassworks, which later forged links with Georges Bontemps.

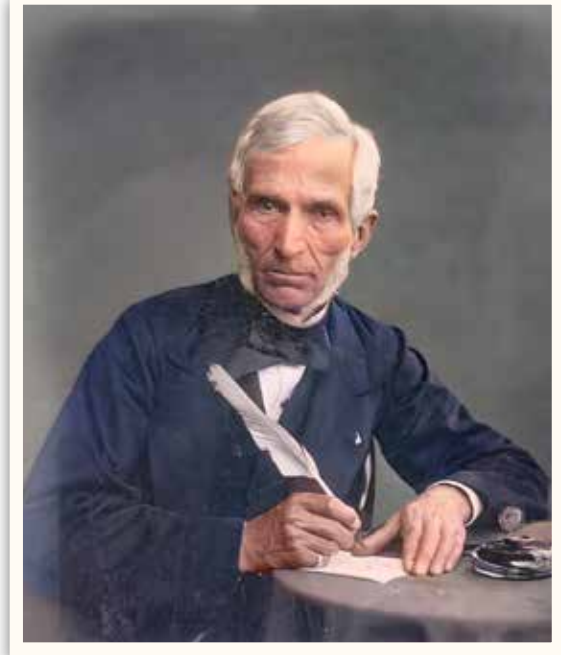
In 1829 Claudet went to England to discuss French and Belgian methods of sheet glass production with Lucas Chance and the friendship prospered thereafter. Although invariably credited with his various photographic achievements and inventions, in 1833 Claudet invented a new means to cut a sheet glass cylinder.

Later, he became one of the first commercial photographers. Living in High Holborn, he learned the Daguerreotype process from its inventor, Louis Daguerre, and bought a licence for £200 [£16,859] from the British patentee, Miles Berry, to operate in England – one of only two practitioners in the country at this time. In 1841 he set up a studio on the roof of the Adelaide Gallery (now the Nuffield Centre), behind St. Martins-in-the-Fields Church, London, and later in two other sites in London.

Claudet developed the use of chlorine as an accelerant, which reduced exposure times and thereby relieved the stress on the sitters: before this, sitters had to endure minutes of posing unnaturally with fixed expressions to avoid a blurred photo, hence the lack of many smiles in these early photos (see p.55). He also discovered the red darkroom light, and his other inventions included a folding stereoscope and an endless belt stereoscopic viewer for viewing a continuous stream of up to 100 images. He was awarded the title “Photographer-in-ordinary” to Queen Victoria in 1853.

Claudet’s company appears to have been named Claudet and Houghton from at least 1841, although following his death in 1867 it was renamed Claudet, Houghton & Son until about 1870. The company sold a diverse range of glassware, from window glass, ornamental glass, coloured glass, glass shades, lenses, photographic slides, microscope slides and other laboratory ware. It is almost certain that virtually all of these glass products were sourced from Chance Brothers.

Although involved in the supply of horticultural glass – an advert from 1854 mentions Hartley’s Rough Plate Glass – the most diverse product the company sold was an innovative glass hyacinth vase, which was originally developed in 1850 by George Percy Tye of Birmingham. Claudet and Houghton seemingly purchased the rights to manufacture these vases, in about 1865.⁴²



Antoine Claudet, probably a self-portrait, taken c.1860

[Wikipedia](#); colourised with software

The reverse of a typical Daguerre print produced by Antoine Claudet



GEORGES BONTEMPS

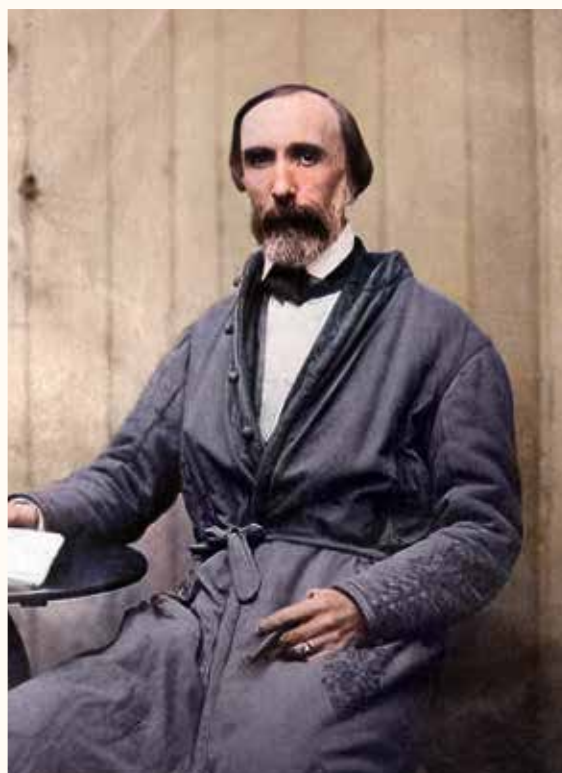
It is believed that Bontemps' father, an officer in Bonaparte's army, refused to acknowledge the illegitimate Georges (originally christened Ferat, his mother's surname). Despite his illegitimacy, Georges received schooling and after he left school in 1817, he achieved an acceptable mark for entry into the exclusive *École Polytechnique* under a pseudonym, but his identity (and illegitimacy) was uncovered leading him to be refused entry.

Georges Bontemps then became an assistant to Aime Gabriel d'Artigues, who owned three glassworks and oversaw the glassmaking at the famous Baccarat concern. These glassworks were taken over in 1822 by the Choisy-le-Roi glass factory, near Paris, and Bontemps then became a director of the new company in the following year.⁴³

The French royal court considered glassmaking to be the pinnacle – almost aristocratic – of all industries. In 1226, Louis IX (1214–1270) decreed that these establishments were the only ones that men of noble birth could manage or own, and thereafter permission was required from the king whenever a new glassworks was to be established.

The only known photo of George Bontemps, around 1855, while at Chance Brothers. The photographer is possibly Claudet
Colourised with software

Courtesy Prof Michael Cable



Bontemps' early years were dominated by working with Augustin-Jean Fresnel (1788–1827) for the supply of optical glass, but this was cut short when the blocks of optical glass burst during the grinding and polishing phase, which probably indicates insufficient annealing. However, one of his early successes was inventing a mixture to create copper-ruby glass, a ruby-coloured glass that used copper oxide as the alloy as opposed to the vastly more expensive gold ruby glass, for which he published the results in 1826. Later, in 1845, he rediscovered the technique of the 16th century Venetians for making ruby glass (see Volume 2, 1848), a process he brought to England in 1848 and from which Chance Brothers greatly benefitted.

From 1829, Bontemps also devoted himself to the painting of windows and even founded a school for art at Choisy-le-Roi.⁴⁴

At the time, Bontemps was an expert in the production of sheet glass, which was a relatively recent development but scarcely known in England. Following his visit to France, Lucas was convinced the future lay with sheet glass.

Bontemps may have been visited in Paris by Lucas during the latter's time in London as a glass merchant, given their mutual friendship with Antoine Claudet, but it was not until 1828 that Bontemps first visited England.⁴⁵

An early agreement drawn by the Company, dated 1832, but not in force until 1834, was between Bontemps and Adolphe-Narcisse Thibaudau (1795–1856) of the first part, and William Chance of the second.

Here, the following was agreed:

... to instruct William Chance in the manufacture of certain Window Glass and Glass shades fluted and coloured glass and also to supply the said William Chance with certain Artisans and Workmen and not to export from France to Great Britain or Ireland any French Window glass glass shades fluted glass or coloured glass ...

The agreement prohibited Bontemps from instructing any other person who '... reside in Great Britain or Ireland not set up or establish any manufactory ...'

In payment, Bontemps and Thibaudau each received £500 [£53,775] per annum, subject to a reduction linked to turnover, but no less than £200 [£21,510] per annum for the term of the fourteen-year agreement.^{45a}

Courtesy SA



AUGUSTIN-JEAN FRESNEL

Another French influence on Chance was the engineer and scientist, Augustin-Jean Fresnel (1788–1827) who developed the first lenses that bore his name and which revolutionised lighthouse optics.

The idea of a stepped dioptric lens that refracted light was first suggested by another Frenchman, Georges-Louis Leclerc, Comte de Buffon (1707–1788) who died in the year that Fresnel was born. But Fresnel's interpretation of this lens brought it into actuality and thenceforth bore his name. Fresnel, though, went further and independently invented the catadioptric lens, which reflected and, later, refracted light.

Like Bontemps, Fresnel entered the prestigious *École Polytechnique* in 1804, at just sixteen and a half years of age. He left in 1806. One of his brothers preceded him and the youngest brother followed him.

His first attempts in 1821 completely transformed lighthouse engineering. The work required to create such lenses, especially at a time when instruments were basic and crude, stretches the imagination; but the principle was proven.

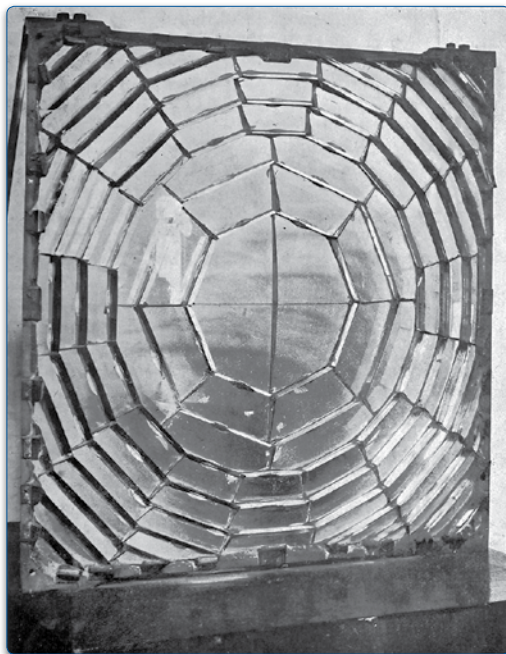
Fresnel also envisaged a mercury bath for floating the immense lighthouse apparatus, often weighing several tons, to provide virtually frictionless movement. This was never developed in his lifetime and was not realised until 1893 (see Volume 5). Sadly, Fresnel's life was cut short after battling with tuberculosis for many years. It remains conjectural as to how much Fresnel could have achieved within a normal life span



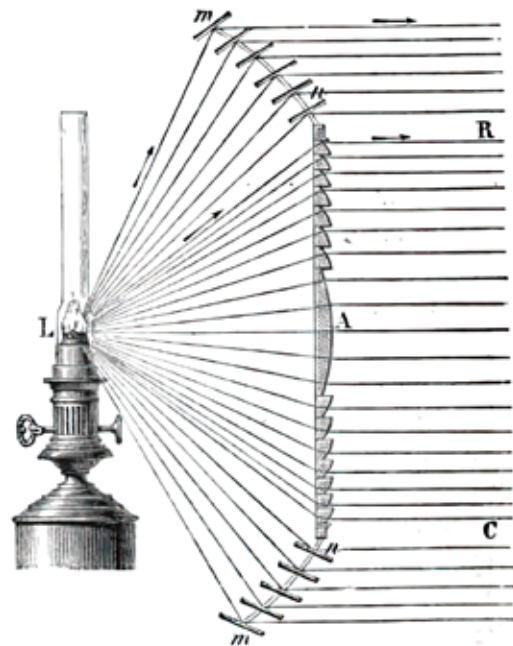
Augustin-Jean Fresnel, the first pioneer of lighthouse engineering

The basic principle of the Fresnel lens.

A light source (L; the focal point) positioned in the centre of the dioptric lens assembly transmits light in all directions. Fresnel calculated the reflection and refraction (bending) of light through the individual prism could then be focussed in a single parallel beam (A to C), intensifying the brightness many times. The mirrors (m to n) merely reflect the light



Fresnel's first lighthouse lens array in 1821. The panel measures 81×78×6cm and consists of 70 glass prisms arranged in a polygon format



SMETHWICK, 1831

By 1831 the town of Smethwick was thriving, and many industries utilised the space along the canals. However, this brought many problems. The growth of industry needed a proportional growth in housing to accommodate the workers, shops to supply provisions and public houses to provide a means of escape or entertainment for the workers. The problem is shown vividly in the rise of the population from 1801 to 1831 in the parish of Harborne:⁴⁹

	1801	1811 ⁵⁰	1831
Harbourn (sic) parish	1178	1284	1551
Smethwick chapelry	1097	1328	2676

Smethwick in 1831 comprised a variety of industries:

Adkin, Nock, & Boyle	Soap and red lead manufacturers
Bordesley Steel Co.	Henry Downing, acting partner
Boulton & Watt, jun.	Steam engine manufacturers, Soho
Croxall, Samuel	Corn miller
Downing, Mary	Blacksmith
Downing, William	Maltster
Hadley, Joseph	Iron manufacturer
Hartley, John	Glass manufacturer (British Crown Glass Co.)
Hayes, Benjamin	Locksmith
Lea, William	Jeweller
Loach, Thomas	Cooper (barrel maker)
Mason, Samuel	Joiner
Ray, William	Lime burner
Record, Ann	Free school
Robinson, Thomas	Common brewer
Rowe, John	Blacksmith
Smethwick Brass Co.	Manufacturers of ingot brass; Hy. Pratt, agent
Unett, John	Solicitor
Vernon, Joseph	Tailor

A complete community with many of the trades allowing it to be self-sufficient.

To serve all the thirsty workers, there were a few Inns & Taverns:

Bear, Rd.	Sankey, (& horse dlr.)
Blue Gates	Ann Holloway
Boat	George Thompson
Chapel House	Richard Scott, (& veterinary surgeon)
Engine & Forge	Samuel Sheldon
Plough	Samuel, Downing, (& maltster)
Swan	Joseph Morris, (& maltster)

Aside from these, there were also ten beer houses, five shoemakers, four butchers, four farmers, two "beaks" and four shopkeepers. One prominent name was Downing, who was a maltster, operating from premises just across the glassworks in Spon Lane, but it appears that many members of his extended family had livelihoods within the hamlet. Downing almost certainly gave his name to Downing Street in Smethwick.

One unusual entry is for Mary Downing, who was listed as a blacksmith.

The beaks may have been doctors, using a term that had hung over from the Great Plague.

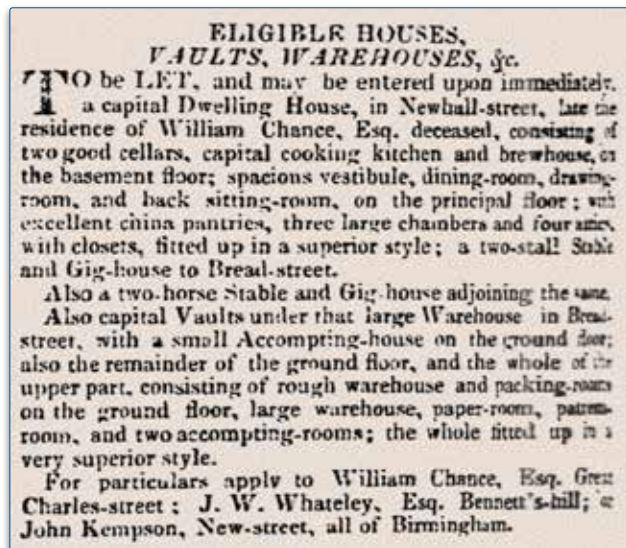


In just thirty years, Smethwick had a population that was now 40% larger than the entire Harborne parish in which it was located,⁵¹ but had doubled in just twenty years, from 1811 to 1831.⁵²

THE IRON FACTORS, 1820–1828

To continue with the history of the iron factors, in August 1820 at the age of 71, William Chance (IV, 1749–1828), left his house in Malvern Links, Worcestershire and moved to premises at Newhall Street in Birmingham, just around the corner from the factoring business. The house in Malvern Links was described as having a large garden with 'Fruit Trees now in full bearing ... and within ten minutes walk of Malvern'.⁵³

On his death in March 1828, William's (IV) house was placed on the market, to be let and as seen by the advertisement (below) that was placed in *Aris's Birmingham Gazette*, it was very spacious with '... a two-stall Stable and Gig-house to Bread Street' and obviously fitting for a man of his means.⁵⁴ A Gig was a two-wheeled carriage, drawn by a single horse. Sadly, the father of Lucas, William, Edward and Henry, passed away without truly seeing how all his son's future ambitions flourished.



MESSRS. CHANCE & SON, FACTORS

The original factoring company of Chance & Homer (thereafter named Messrs Chance & Son from 1825 following the death of Edward Homer), which preceded the glassmaking business, from 1816 was run by William Chance (V) with his brother George operating in New York, USA. Interestingly, one town directory of 1830 has the listing for the iron factors as:

Chance Wm. American, Gt. Charles-st⁵⁵

The 1816 partnership that involved William (IV), Lucas, and Edward Chance, and George Crane was dissolved on 31st October 1816. It is noticeable that Edward Homer is not shown.⁵⁶ This was normal practice when one partner left or died and a new partnership was created soon afterwards by necessity.

Later, on 3rd November 1823, two partnerships were dissolved. The first was the original factors comprising, William (IV), Lucas, William (V) and Edward Chance, and George Crane.

The second partnership was the factors started by William (V), which also included: William (IV), Lucas, George and Edward Chance, and George Crane.⁵⁷ This firm moved to new larger premises on Great Charles Street, which ran parallel to Bread Street.

These dissolutions were probably due to either Edward leaving to pursue a new career as a publisher (see p.27), or Lucas requiring funds to maintain the glassworks.

Following the death of William (IV), the partnership was once again dissolved on 21st March 1828. The factors were then merged, leaving William (V) to consolidate a larger business. Apart from other bequests, William (IV) bequeathed £50 [£4,498] to the General Hospital in Birmingham.⁵⁸

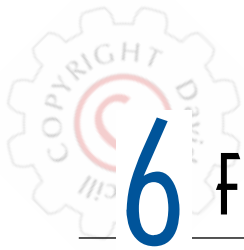
The original premises in Bread Street (now Cornwall Street), run by Messrs. Chance & Son were described as 'a spacious warehouse and packing room.' The lease to this property was due to be sold by auction at the Globe Tavern on 21st April 1828,⁵⁹ and again on 13th May 1828, but neither auction appears successful (see below).⁶⁰

However, certain difficulties in transferring the assignment of these deeds were reported in *Aris's Birmingham Gazette* when certain indentures relating to a mortgage on the Bread Street property had been mislaid. These two documents dated back to 1786 and 1790 and 'A Handsome Reward' was offered to anyone who could provide further information as to the whereabouts of these deeds.⁶¹

Even as late as 1848, the old warehouse in Bread Street was still being rented out, with applications to 'Messrs Chance, Son, & Co., 152 Great Charles Street'.⁶²

CHANCE'S US AGENT

The first American agent established by the Company was George Chance, Lucas and William's younger brother (see p.34). He resided in New York from 1816 until 1837, during which time goods from the iron factors Chance & Homer (Messrs Chance & Son after 1825) in England, were exported to the US company of William & George Chance: this provides a narrow timeline for any goods marked with the partner's names; "William & Geo. Chance" for example. After George returned to England, he was replaced by William's (V) son, also William (VI), and the US importer was renamed W. Chance, Son & Co., while the goods were invariably marked "W. Chance & Son" (see p.81).



6 Financial Problems, 1831–1833

*Glass, china, and reputation are easily cracked,
and never well mended.*

—Benjamin Franklin (1706–1790)

Despite being a great innovator and industrialist, Lucas was not beyond making mistakes. By 1831 he found himself in serious financial difficulties due to increased liabilities for capital raised on a mortgage following the building of Furnace N°3 in 1828 and other building extensions.⁶³ Also see Appendix 2. He then incurred heavy losses in a failed venture with a manufacturing chemist named John Badams (1792–1833), who lived in Birmingham.

The *Bankers' Circular* was the first to report upon this on 8th April 1831:

A house in the glass-trade, Messrs. R. L. Chance and Co. stopped payment on the 6th inst. Whose liabilities are great: we understand the amount of their debts considerably exceeds the whole amount of the debts of the two London Banks that stopped payment in the previous weeks.

This seems to indicate that it was Lucas's merchant business being referred to and not the British Crown Glass-Works Co. The newspaper continued,⁶⁴

The failure of this house is owing, we believe, principally, to excessively large shipments to overstocked foreign markets

This reason for the failure is unusual, given that the problem involved both Lucas and Badams, with the latter having nothing to do with the distribution of glass. This was further headlined in the country-wide press five days later as '*Extensive Failures*' and continued:⁶⁵

The newspaper report expanded on Badams' crisis:⁶⁶

The house of Richards and Macintosh, of London, were the first to strike a blow against Mr. Badams; they took possession of the whole of his works yesterday week, by an execution under a judgment bond of £52,000. In addition to this security, it is said that the same house have heavy mortgages upon the whole of Mr. Badam's property.

£200,000 in 1831 is worth about £17.2mn in 2023. However, the amount of indebtedness that Lucas sustained was probably distorted by the media; the real figure appears to be a precise £37,641 8d [£3.23mn]. This is according to a personal account of Lucas's affairs and those of British Crown Glass Co.'s dated 1831 that detailed '*Doubtful debts*'. Here it shows the following:⁶⁷

John Badams balance of a/c	14,800	1	1
" my accepties(?) see contra	47,448	18	4
" drafts on Badams &c. see con:	5,700	4	6
" contingent liabilities	9,700	0	0
Total	£77,649	3	11
less bills on Basil Montague	£10,000	0	0
TOTAL	£67,649	3	11

This total is worth about £8.1mn in 2023.

A later report in the *Leicester Journal* shows the extent of the problem:

Mr. Badams drew largely upon Mr. Chance, and it is said that not less than £75,000 of these acceptances are now afloat

EXTENSIVE FAILURES.—The chief topic of conversation in Birmingham, during the present week, has been the failure of Mr. R. L. Chance, the glass-merchant, of London; and Mr Badams, the extensive working chemist of this town. The obligations of the former are said to amount to at least £200,000, while those of the latter will approach nearer £300,000. Both failures were known in Birmingham on Saturday last.

Furthermore, there were six bills amounting to £25,143 17s 8d [£2.16mn] where non-payment was expected; ‘... none of which will be paid at maturity from part of the account against W. Badams’. The identity of W. Badams is not known, but perhaps a brother of John, as W. Badams later attempted to continue business in a similar vein after John Badams’ premature death in 1834.

According to Robert Johnson’s 2016 thesis, *From Georgian Traders to Victorian Manufacturers*, the £200,000 quoted in the press was an exaggeration. This is supported by the liabilities totalling £155,847 [£13.38mn], of which £47,448 [£4.07mn] were ‘drafts accepted by RLC on John Badams’. His assets covered £118,256 [£10.15mn] leaving a deficit, on paper, of £37,591 [£3.23mn]. Aside from this, the British Crown Glass Co. also had a deficit of £24,130 [£2.07mn] and Lucas admits in a note dated 9th May 1831 that he had lost £79,248 [£6.8mn] in the past two years.⁷⁸

In 1830, two Birmingham-based glass companies had gone bankrupt: the Crown Glass Company* and Britannia Glass Works, which along with other failures caused difficulties for some banks. In these days, many smaller private banks offered overdraft facilities and these losses were not always sustainable. George Nicholls, the Birmingham agent for the Bank of England, offered discount facilities to John Badams, that later caused a Bank of England agent to comment on Badams as being, ‘something of a mystery.’⁷⁹

Coupled with debts incurred by the British Crown Glass Co. of £82,878 3s 4d [£7.11mn], Lucas and the glassworks were left with total liabilities of £155,897 0s 8d [£13.38mn]. Against these debts, the combined assets of Lucas and British Crown Glass totalled £118,256 [£10.15mn], so on paper the resultant indebtedness was £37,641 0s 8d [£3.23mn]. Also see Appendix 2.

Despite these enormous losses, Lucas wrote in a remarkably dismissive way;⁶⁸

In regard to Badams I may lose money by him or I may gain a fortune, and as I have no fancy for things that appear to hinge on chance I am sorry to have had anything to do with him. Still, on review of all circumstances, I have nothing to blame myself for.

Glass duties and a general depression in the glass trade caused by the excise duty and window tax, all conspired to left Lucas with severe cash difficulties.

Thomas Carlyle in 1854. A high quality photograph taken by Robert Scott Tait. The grumpy countenance can be explained by the need for the sitter to remain perfectly still for a very long period

JOHN BADAMS

Why Lucas Chance explored this risky route, could be explained by Badams’ reputation as a Birmingham-based chemist, who owned a company involved with the manufacture of sulphuric acid. He was also a friend of Thomas Carlyle (1795–1881), a well-known Scottish philosopher who was celebrated in Victorian times.

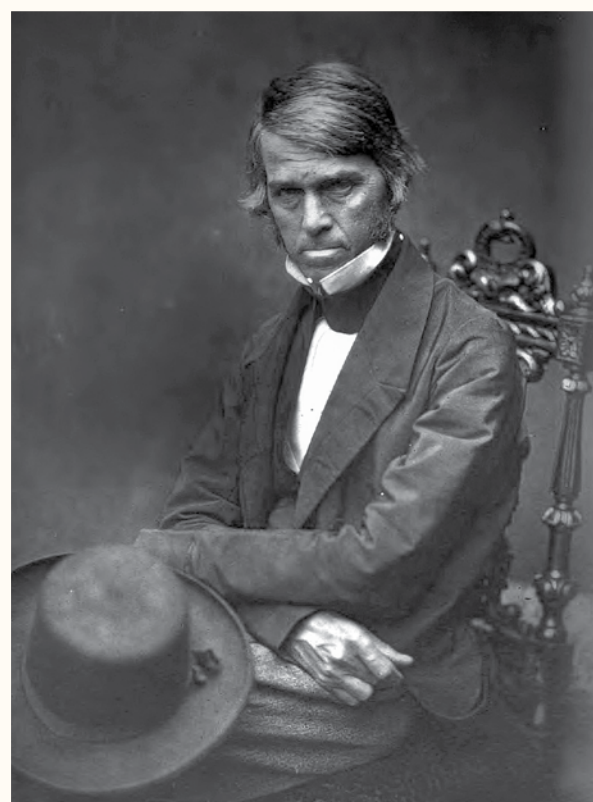
According to *The Carlyle Letters Online*.⁶⁹

John Badams was the son of a plumber, came from Warwick, was educated by the celebrated Dr. Samuel Parr, who sent him to Edinburgh University to study medicine. He matriculated in 1811, and gave up after 1813.

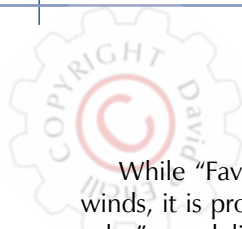
Badams’ commercial career was varied, starting with his first business partnership that was dissolved in 1816,⁷⁰ and another in August 1823 with John Tyrrell, after a new species of verdigris was discovered a year earlier.^{70a}

Badams was also an opportunist, who in 1824 had concocted a cure for Thomas Carlyle’s dyspepsia.⁷¹ Although Badams and Carlyle then became friends, it appears that Carlyle got the measure of Badams, describing him rather cryptically in a letter to his brother, John, dated 11 February 1830,

Wait not on Badams: his are Favonian gales, and no true trade-wind. Look with your own eyes, and think with your own head



* The failure of the Crown Glass Company does not appear to link with the British Crown Glass-Works Co.



While “Favonion” indicates warm and mild westerly winds, it is probable that Carlyle’s oxymoron “Favonian gales” was deliberate.

Nonetheless, Badams was undoubtedly a chemist of some renown having written a scientific paper for the *Annals of Philosophy* in 1825 that was named *On a Scarlet Sub-chromate of Lead, and its Application to Painting and Calico Painting*. This was also followed by a patent in the same year (Nº 5,174 dated 16th May 1825) that involved the extraction and purification of metals from lead ore⁷² This invention may have led Lucas to invest heavily into his project for an economical method to produce salt cake, or another suitable alkali.

The first major downturn in Badams’ fortunes was when his business, the Dartmouth and Ashted Works, burnt down in February 1827, which caused the death of an employee, who had inadvertently started the blaze.⁷³ Soon afterwards, he was sued by Sir George Nugent, Bt, as executor for Philip Skinner, which was described as ‘the residue of a sum due upon bond’: the sum involved was £834 12s 6d [£75,762], so not trifling amount.⁷⁴

Just prior to this, in 1826 the Bank of England gold reserves collapsed, leading to the failure of several smaller banks. Subsequently, lending became very restricted and this might have been a precursor to Badam’s misfortunes, being unable to raise capital to rebuild his business.^{74a}

Despite all these problems, John Badams married Louisa Holcroft whose father lived in affluent Brunswick Square, London on New Year’s Day 1829.⁷⁵ Badams was also a man of some standing, being Chairman of the recently-formed Birmingham Society of Arts in 1829: another member being W. Chance, Esq, High Bailiff, Lucas’s brother.⁷⁶ It is possible, therefore, that the link between Badams and William Chance (V) fostered an introduction with Lucas. In turn, this made William feel partially responsible for the business collapse and the need to support his brother. Within this society, Mr Clarke sculpted a marble bust of Badams, although it was described as ‘slightly fantastic and capricious’ in its execution. Badams was also opposed to slavery and is included among a list of well-known people with similar ideals from around the country.⁷⁷

SALE OF ELEGANT FURNITURE.
Grand Piano-forte, superior old Wines, superb Drawing-room Suite, valuable Oil Paintings and Water-colour Drawings, scarce Prints, extensive Library, fine Busts and Vases, &c. at Lady-wood House, Birmingham.

TO be SOLD by AUCTION, by E. & C. ROBINS,
on Monday the 13th of June next, and following days, each morning precisely at eleven o’clock, upon the premises at Lady-wood, all the elegant and very superior **HOUSEHOLD FURNITURE and EFFECTS** of John Badams, Esq. comprising lofty four-post and tent bedsteads, with carved Spanish mahogany pillars, clothed with excellent moreen and fine London chintz, best curled horse-hair mattresses, in superfine linen-tick cases, prime white goose-feather beds, large blankets and counterpanes, fine bed and table linen, handsome Spanish mahogany and Bamboo dressing-tables, with washing stands to correspond, neat stained rosewood chairs, with cane seats, superfine Brussels bed-room carpets, of beautiful patterns and in the best state of preservation, elegant large dressing and cheval glasses, in fine Spanish-wood frames, a very superior Spanish mahogany wardrobe, with cedar slides and drawers, handsome single chests of drawers of the finest Spanish mahogany, several elegant suits of costly damask and moreen window-curtains, with richly gilt cornices, a valuable month clock, very substantial and handsome dining-room effects, made of the finest Spanish mahogany, rich Turkey and Brussels floor-carpets, of large dimensions and equal to new, solid rosewood drawing-room chairs, with best hair squabs and rich damask covers, elegant couches and settees stuffed with the finest wool and covered with rich damask, a beautiful circular table on a noble pillar and stand, a very superior and exquisite toned grand piano-forte, by Stodart, elegant rosewood card-tables, remarkable fine busts and alabaster vases, rich cut glassware, ornamental and useful china, a valuable library of books, upwards of 2000 vols. including many of the most approved works on Chemistry, Philosophy, Arts and Sciences, Antiquities, &c. book-cases, library-tables, choice oil paintings and water-colour drawings, by eminent artists, scarce engravings, maps, upwards of forty dozen of prime old port, claret, and Moselle wine, a good collection of green-house plants, cucumber-frames, sets of best London-made gig-harness, saddles, bridles, horse-clothing, a capital mangle, numerous kitchen and culinary articles, brewing utensils, &c. &c.

Catalogues, with the order of sale, will be ready for delivery on Monday next the 6th of June, and may be had on application at the office of the Auctioneers, 47, New-street, Birmingham.

(† The Furniture will be on view the Saturday previous to the sale.

1831: The disposal of personal possessions and his chemical works must have been devastating for Badams
Courtesy BL

TO CHEMISTS AND OTHERS.
EXTENSIVE WORKS at Ashted, Birmingham.
TO be disposed of, the very complete CHEMICAL WORKS at Ashted, adjoining to the Canal, lately occupied by Mr. Badams, together with the Dwelling House or Warehouse.
The greater part has been recently built in a most substantial manner, and the whole (enclosed by lofty walls and gates) is fitted up with Steam Engines, Mills, and extensive Machinery for manufacturing Verdigris, Colours, and other Chemicals.
To treat for the same apply to E. and C. Robins, Auctioneers, New-street, Birmingham.

The question arises as to how and why the business venture between Badams and Chance went so wrong. Was the fire – albeit three years earlier – the catalyst that triggered the downward spiral, and to which Lucas Chance had absolved himself from the whole affair as ‘... *nothing to blame myself for*’? Although it is not recorded, the alliance of Badams and Chance was founded well before the financial failure of early 1831, so it is worth speculating whether the fire and the financial collapse are both interconnected.

Following the collapse of his venture with Lucas, Badams’ household effects were auctioned on 13th June 1831. The list of items showed that he had been living in some style, with all the trappings of a wealthy man.⁸⁰ In addition, ‘... *the very complete CHEMICAL WORKS at Ashted ...*’ was advertised for sale by the auctioneers, E & C Robins.⁸¹

Following what may have been a period of depression, sometime after 1831 Badams moved to Enfield, Middlesex, where he managed to lose more money on gambling and mining speculation.

Badams died at his home in Church Street, off Edgware Road, London, on 14th September 1833, aged about 41. On hearing this Carlyle wrote, ‘*A deep Tragedy, transacted before one’s eyes, you might say in one’s very household circle; for Badams was among the men I loved most in the world.*’ Some thirty years later and Carlyle was still agonising over ‘*poor Badams*’, perhaps due to a certain level of guilt.

Belatedly, after his death, the *London Gazette* listed Badams under the Court for Relief of Insolvent Debtor.⁸² Later, the ‘*Miscellaneous Property*’ from the Dartmouth and Ashted Works was still being advertised.⁸³

Although little is known about the outcome of the Ashted Works, a relative of Badams’ is assumed to have carried on the business, as it is known that a partnership between ‘*S Thornley, Snr. And W Badams, Birmingham, colour manufacturers*’ was in operation in 1835,⁸⁴ although this was dissolved in 1837.⁸⁵

By 1834, a notice was placed in *Aris’s Birmingham Gazette*, alerting creditors that a dividend of five shillings [£] in the pound was realised on Badams’ effects. In other words, a return of 25%. Presumably, Lucas’s indebtedness with Badams was partially reimbursed.

It should be noted that despite the vows of British Crown Glass and the mercantile business, on paper Lucas was not insolvent although his combined businesses suffered from a serious cashflow problem.

Lucas’s crisis, which could have finished the company, (and made this book a very slim pamphlet), was resolved by the intervention of his younger brother William (V), who found the capital to meet the debts and in doing so temporarily took over the freehold of the property. In 1832, William became a partner in the firm and although regularly attending the board meetings, he took very little part in the day-to-day management of the company.

Apart from his financial backing, William’s more considered attitude juxtaposed Lucas’s often rash and impetuous nature.



The fine glassware produced by Rice Harris (top) and Bacchus (bottom) is in stark contrast to Chance’s utility glass



7 William Chance & the Riots

William Chance (V, 1788–1856) was Lucas's younger brother by six years. He entered the Chance & Homer iron factoring business in Birmingham with his brother George (1790–1861) when Lucas left to take over management of the Nailsea glassworks in 1810. The success of the Birmingham operation meant that new premises were necessary and these were rented in Great Charles Street, Birmingham. George then moved to New York where he set up an office to handle the imports of goods on behalf of the business. Here he met and married Cornelia, a daughter of the wealthy de Peyster mercantile family. Two of George's sons figure prominently in the later history of Chance Brothers: William Edward Chance (1842–1923) and Alexander Macomb Chance (1844–1917).⁸⁶

William remained in Birmingham to run the family business and after living in Newhall Street for a while, he settled at Spring Grove in Monument Lane (now Monument Road), in Edgbaston, which is now part of the Calthorpe Estate.⁸⁷ This area was preferred by the wealthy industrialists and managers, due to the prevailing south-westerly winds that kept away the obnoxious smells emanating from the industrial city centre.⁸⁸

William's life was extremely busy and he not only advanced his business life but took on several public duties that increased his social circle. For our younger readers, the surfeit of technology such as mobile phones, computers, game consoles and streaming video gives them ample opportunity to be entertained. In Victorian times none of this existed and entertainment was piano playing, singing, recitals, parlour games, philosophical pursuits or philanthropic endeavours.

William was also a staunch Christian and a prominent member of Birmingham's Auxiliary Bible Society. Other members of this society were Rice Harris, who can be credited for introducing the process of pressed glass into the country in 1832; George Bacchus, who formed a glassmaking company of renown; and Richard Tapper Cadbury (1768–1860), whose sons later founded the Cadbury chocolate-making dynasty.⁹² William was also a member of the Birmingham Committee for Proprietors of the Norwich Union Insurance company, whose total capital in 1826 exceeded one million pounds [*£82mn*]. Another glassmaker, Brueton Gibbins (1783–1855), the owner of the Aston Glass Works, also sat on this committee.⁹³

William served on many committees. In 1827, he was appointed to the Committee for the General Institution for the Instruction of Deaf and Dumb Children,⁹⁴ and next year onto the Committee for the Society for Promoting Christianity among the Jews.⁹⁵ Its critics, meanwhile, labelled the evangelical tide that swept through England in the early part of the nineteenth century as "the English madness".⁹⁶

Further philanthropy followed. In 1828, he donated 10 gns (£10 10s [*£945*]) to the Birmingham Female Penitentiary,⁹⁷ and, in the following year, he gave his time to supporting the Birmingham Dispensary that provided medical relief to the poor. The figures provided by a Medical Report for the previous year showed that 3,897 patients were treated under the Dispensary, with 2,068 receiving vaccinations.⁹⁸

A portrait of William Chance (V), by Thomas Phillips. The date is unknown, but judging by the youthful appearance, William is probably about 35 years of age (1823)



In January 1830 he was Chairman of the Society for the Suppression of Mendicity – essentially, a union to prevent beggars from seeking money by begging by being proactive in providing support. Tickets were purchased by patrons of the charity and then given to beggars who could exchange them for goods. However, there were critics of the Society.

In 1824, *The Times*, a radical newspaper at this time, had already questioned its effectiveness, and how much of its money was afforded to beggars compared with the amount that was received by the Hon. Secretary as a bonus.⁹⁹ Later in that year, this brought an action of libel against the newspaper. This, though, did not prevent *The Times* from continuing its attacks on the Society and in 1826 it pointed out that as a joint-stock company, £3,500 [£287,269] was ‘consumed annually’ by its managers.¹⁰⁰ Despite the press criticism, the Society continued until 1959.

Contributions and committees aside, in October 1829, the *Birmingham Journal* reported that William was appointed as a director to the Joint Stock Banking Company for Birmingham.¹⁰¹ A report in the *Birmingham Journal* dated 16th January 1830, shows that William was also a Trustee of the Birmingham Savings’ Bank,¹⁰² which was later reported in a local newspaper, ‘nearly twelve hundred pounds, interest on deposits, have been distributed among the working classes of the town ...’¹⁰³

As has already been noted, the press was not always supportive of William’s aims. Yet another spat with the *Birmingham Journal* was due to the newspaper being highly critical of the British and Foreign Bible Society as they ‘dared’ to mention the:¹⁰⁴

... funds of the ... Society were misapplied, viz:—In extravagant salaries paid to itinerant orators, and in the enormous expediture of the town establishment, in splendidly furnished suites of rooms for each secretary

STREET LIGHTING

As early as 1818, street lighting by gas had started to be installed in a few streets in Birmingham.⁴⁶ William and George Chance petitioned the Commissioners of the Birmingham Street Acts in 1826 to reverse their refusal to lay pipes in other streets ‘to prevent the breaking up of the pavements’, which the Court countered by quashing the refusal.⁴⁷

This set the standard by allowing gas lighting around, and into, certain commercial premises. It is known, for example, that as early as 1810 the glassworks of Jones, Smart, & Co. in Aston Hill, Birmingham was lit by gas that was generated on the premises. The purpose was clear: to enable longer working hours and greater output.⁴⁸

FROM CONSTABLE TO HIGH BAILIFF

Amongst his many public duties, William was awarded the honorific title of Constable of Birmingham in 1817, which gave him the responsibility of overseeing law and order. William was then appointed High Bailiff of the Court Leet for the Manor of Birmingham on the 28th October 1829. The outgoing Low Bailiff was another glassmaker, Thomas Osler.⁸⁹

COURT LEET.—At this meeting on Wednesday last, the following gentlemen were appointed to their respective offices for the ensuing year:—
Mr. William Chance, High Bailiff.
Mr. Edward Corn, Low Bailiff
Mr. William Harley, } Constables.
Mr. Charles Fairfax, }
Mr. Walter Brinton, Headborough.
Mr. William Hill, jun. Constable of Deritend.
Mr. Francis Marrian, } Ale Conners.
Mr. Robert Spurr, }
Mr. Richard Tutin, } Flesh Conners.
Mr. Wm. Ludlow, }

Courtesy of BL

The announcement in the *Birmingham Journal* is interesting as it lists four of his deputies as “Ale Conners” and “Flesh Conners”.¹⁰⁵ These men ensured that the quality of ale and meat respectively conformed to an expected standard. Of the ale, an additional task was to ensure it was not watered down, or that short measures were not passed onto the customer.

Serving the High Bailiff was a Low Bailiff and then constables. This effectively gave William the power to enforce the law, serve summonses and execute warrants. During his tenure as High Bailiff, he met the eleven-year-old Princess Victoria, who was given a tour of the Chance glassworks.⁹⁰

Another civil position he held was being voted in as Birmingham Street Commissioner in 1828.⁹¹ This post had gradually accumulated more power since its induction in 1769. Later, in 1835, he was appointed one of the Commissioners of the Street Act, along with several other people.





THE GENERAL POLITICAL UNION

As a High Bailiff and then a magistrate, William proved to be a politically conservative figure and was unsympathetic to the local call to extend the franchise, by joint pressure from the middle-class and the disenfranchised working-class for the formation of a General Political Union.¹⁰⁶

Aris's Birmingham Gazette of 18th January 1830, reported a call by over 200 signatories who urged the High Bailiff to support a proposal to create a political union combining both lower and middle-class support. This was denied by William who posted in the same issue, underneath the proposal:¹⁰⁷

TO THE GENTLEMEN WHO SIGNED THE REQUISITION TO THE HIGH BAILIFF

I regret that I should feel it necessary to refuse the request of any of my respectable Townsmen, but one of the objects contemplated by the Requisitionists being the formation of a General Political Union, I cannot view it as any part of my duty to call a Meeting of the inhabitants of the town for a purpose of this kind.

WILLIAM CHANCE, High Bailiff

Birmingham, January 14, 1830.

William's response to the tradespeople of Birmingham. His reasons for rejecting the request are unclear, but his personal political affiliation was with the ruling Tory party, which was opposed to such changes

This was immediately countered by the Requisitionists, who called a meeting 'of the Merchants, Manufacturers, Tradesmen, Mechanics, Artisans, and other Inhabitants of the town of Birmingham' at Mr Beardsworth's Repository on 25th January, which attracted 12,000 to 15,000 people. A petition presented to the Houses of Parliament, was then defeated by 119 to 157 votes.

William Chance's philanthropic nature was ably demonstrated when he chaired a meeting for the Relief of the Poor in January 1830. This attracted numerous subscriptions with the total exceeding £320 [£30,244] that once more included William with his customary 10gns (£10 10s [£992]). Tickets were provided to the poor who could exchange them for 'Blankets, Coverlets, Flannel Waistcoats and Petticoats, and Coal.'¹⁰⁸

William was actively involved in supporting The Female Penitentiary, renamed the Birmingham Magdalen Asylum in 1830. This institution gave support to 'destitute girls' – an often-used euphemism for prostitutes – by providing religious education and instruction in needlework to enable the girls to earn a living. However, the girls being rehabilitated, who were essentially inmates behind locked doors were known to escape and often returned to their old ways.¹⁰⁹

He also supported a reformist attitude towards Britain's criminal code, consistent with the contemporary

work of Sir Robert Peel, the Tory Home Secretary, to remove the death penalty from many offences. The punishment for forgery was invariably execution, which William deplored. Following a meeting on 12th March 1830 which he chaired, a seven-point petition was presented to the Houses of Commons calling for the abolition of this penalty.¹¹⁰

William was also an advocate for "Free Trade to the East" (specifically India and China) for which he contributed £10 [£945],¹¹¹ and supported the Birmingham Self-Supporting Dispensary,¹¹² and the London & Birmingham Railway.¹¹³

THE DUKE OF WELLINGTON'S VISIT

Another high-profile visit proved eventful. In his capacity of High Bailiff, William invited the Tory Prime Minister, the Duke of Wellington to Birmingham along with Sir Robert Peel, who is best known for the "Bobbies" and "Peelers", the nickname given to members of the newly created Metropolitan police force of London in 1829.

According to J. F. Chance, this visit was probably an attempt by William to persuade the politicians to consider allowing the town of Birmingham to elect its own MP,¹¹⁴ although other accounts suggest that Wellington and Peel specifically asked for this topic not to be broached.

A much earlier meeting held at Newhall Hill in 1819 was attended by up to 60,000 people who appointed Sir Charles Wolseley, Bt. (1769–1846) as the 'Legislatorial Attorney and Representative' for Birmingham. A year later, Sir Charles was imprisoned for 18 months on sedition and conspiracy charges.¹¹⁵

Unfortunately for William, the visit of Wellington and Peel did not go according to plan; 'on entering their carriages, they were assailed by considerable hissing from the populace'.¹¹⁶

Due to the unpopularity of the Tory government and its opposition to parliamentary reform, hostile booing and hissing crowds lined the newly cut Birmingham to Smethwick canal – an engineering feat carried out by

Thomas Telford (1757–1834) and finished in 1828 – on which a barge carried the dignitaries to the glassworks.

By all accounts, the Duke was amazed by what he saw at British Crown Glass-Works Co. and, although this is not mentioned specifically, it was almost certainly the skills demonstrated by the crown and sheet glass workers that took his attention. It is quite probable that William or Lucas would have taken the opportunity to quietly mention the egregious nature of Excise Duty.

In the evening, the party retired to the Royal Hotel in Birmingham for a banquet hosted by William Chance, in his capacity as the recently elected High Bailiff. Unfortunately, before long a crowd gathered outside, no doubt fuelled by alcohol, shouting threats and insults followed by a hail of stones, which broke all the windows, a common form of protest.¹¹⁷ Ironically, this action indirectly brought more business to the glassworks. Breaking windows was a common form of protest at this time.

Significantly, most of the press dealt with these instances in a very favourable light, with little or no remark on the disturbances. Unfortunately for William, the local *Argus* newspaper was vitriolic and his well-intended actions were mocked with seemingly endless invective. William was portrayed as a 'flunkey' who continually bowed and scraped in the presence of Wellington, and was labelled variously 'a toad-eater, hat-holder, and Court-Leet slave'.¹¹⁸ However, given that the *Argus* conveniently overlooked the original point of organising the visit – to encourage the sitting Tory Government to support representation for the town of Birmingham and to relieve excise duty – it is probable that the report was not entirely factual.

Although the visit was not a resounding success, in February 1831 Edward Protheroe and Lucas Chance

delivered the Reform Petition to Viscount Althorp.^{118a} This preceded the first reading in the House of Commons, which led to the Reform Bill of 1832, effectively moving the political power from nobility and landed gentry to elected representatives from the larger industrial towns.

Another engagement for William was as Chairman and Director for The District Fire Office, an insurance company and not of a philanthropic nature. As many buildings were still constructed mainly from wood, any fire could prove ruinous to a business, particularly those that required furnaces as part of their operation. With the added threat of fires spreading between buildings, no-one was entirely safe.¹¹⁹

In 1839 the Chartist movement (fl.1838–1857) organised a rally at the Bull Ring in Birmingham to support the Charter for reform and universal suffrage. William was the only available magistrate to take decisions and this placed him in a quandary. Birmingham at this time did not have a police force so it was felt necessary to call upon the London Metropolitan Force, which travelled by rail to Moor Street Station. Although the meeting started peacefully, it soon descended into chaos and affray. William suggested that the use of sabres by the police would merely inflame the crowd and so the police force advanced on the unruly crowd armed with wooden staves.

This caused the crowd to dismantle the railings of nearby St Thomas' Church and counter-attack the police, resulting in two policemen being stabbed and several others seriously wounded. The crowd was only dispersed once the 4th Royal Irish and Company of the Rifle Brigade intervened.¹²⁰

Despite these setbacks, William served as a magistrate for the rest of his life.

A depiction of Chartist riots



The Importance of Sheet Glass

During 1830 Lucas Chance with one of the Hartleys, probably James, first visited the manufactory of Choisy-le-Roi, near Paris, where Lucas met once more with Georges Bontemps, with Antoine Claudet acting as an intermediary. This was not the first time that Lucas witnessed the making of sheet glass, as between 1815 and 1824, he made several visits to France at the invitation of Antoine Claudet.¹²¹

Since his visit to Choisy-le-Roi, Lucas knew the manufacture of sheet glass (aka "German" or "Bohemian" sheet) was the future for window glass and while he met the strongest of opposition from the Hartley brothers, once again his forceful personality won through.

Forty years earlier Isaac Cookson & Co. of Newcastle-upon-Tyne (a company with a glassmaking pedigree stretching back to 1728) and The British Plate Glass Co. of Ravenhead, Lancashire, had experimented with German spread glass – a cruder form of sheet glass – but both companies had abandoned the manufacture as unworkable due to the poor quality glass it produced. Cookson himself commented in 1833 that the glass ‘... is what we call cockled; it is more like horn’, “cockled” meaning an uneven surface, so it is possible flattening had not been refined. Critically though, Cookson found ‘There is no consumption in this country’ and with this low-quality glass only being acceptable abroad he discontinued the manufacture of it.¹²²

By about 1738, the company started its first crown glassworks, and it grew to include various other business interests including salt and alum refining, coal and lead mining, iron making and even banking.¹²³ Although the largest glasshouse by far when Lucas Chance founded his company in 1822, it took just over two decades before Cookson’s glassworks was sold off and Chance became the leading glassmaker in the United Kingdom.

In comparison, the USA manufacturers were early adopters of the sheet glass process and by 1833 many had already moved to this method in preference over crown. The growth of this industry in the US was very rapid with 23 sheet glass factories in operation with an estimated production of 5,625,000ft² of glass produced annually, worth around \$850,000 [\$27mn = £19.5mn].¹²⁴

Well before Lucas Chance introduced sheet glass to Britain, John Robert Lucas and William Chance (IV) at Nailsea were granted British Patent No 2,182 in 1805, for “An Improvement in the Art and Method of Making, Spreading or Flattening Sheet Glass, Plate Glass or any other Spread Glass requiring a polished surface”.^{124a} As sheet glass was never produced by Nailsea at this time, it is probable the quality was inferior to crown.

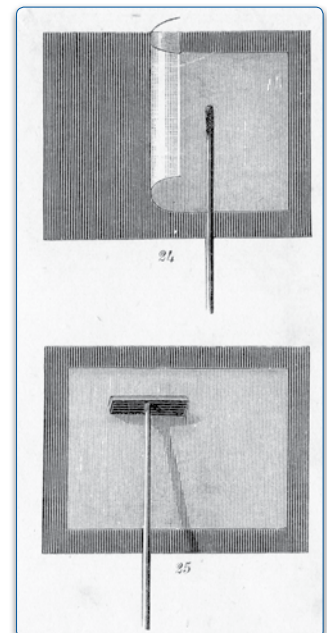
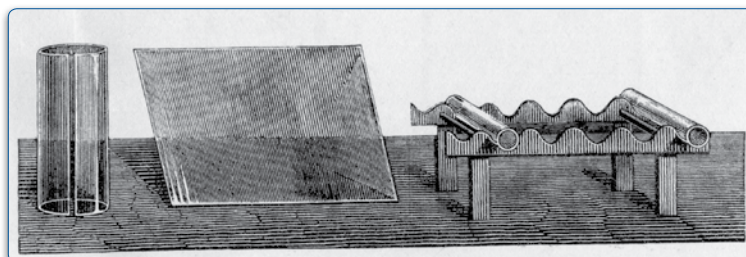
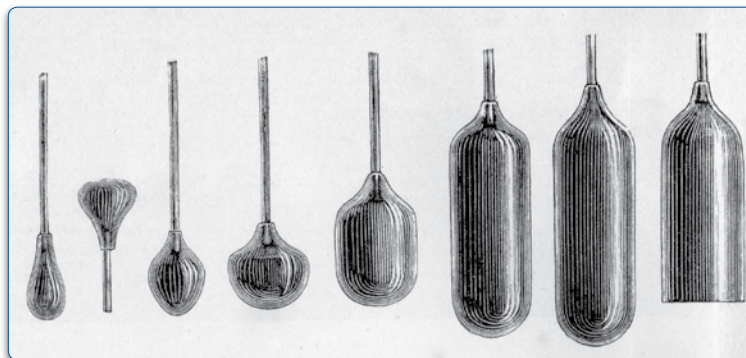
Whilst crown glass produces a fairly consistent pane of glass and is much brighter than sheet due to its fire-polished surface, it is also a wasteful method of production as the bullseye (or bullion) was either

Making Sheet Glass

Top: The various stages in forming a sheet glass cylinder.

Bottom: The cylinder is split along the length and then flattened

Far right: The process of flattening and smoothing the cylinder



returned to the pot or used as the lowest grade of glazing possible. The bullseye was just an irregular lump with annular rings radiating outwards. This pane of glass had little credibility other than allowing some light to pass through it. Later, after John Hartley Jnr's patent (see p.84) refined the bullion, it became more suitable for use as a decorative piece of window glass.

With the duty at 73s 6d [£296] per hundredweight (50.8kg),¹²⁵ a cavalier attitude to waste was expensive. Maximising the surface area of the crown disc involved an elaborate marking up procedure for each crown blown, which is best described by the accompanying diagram for a 48-in. "table". This still represented about 10% of waste. Various other templates were made according to the size of the disc.¹²⁶

A “table” refers to the glass from a single sheet, or crown of glass. German sheet glass obviated the problems of a wavy surface and allowed larger shades (domes) to be produced.

Crown was marvelled at by its brilliant finish. George Richardson Porter wrote in 1832, '*The name of crown glass is given to the best kind of glass commonly used in making windows*'.^{126a}

In contrast, the efficiency of the sheet glass process was incomparable: much larger sheets, about 36×20-in., allowed single panes to be produced with far less waste and without the restrictions of the crown process. One side-effect was that the manufacture of window frames became simpler and cheaper due to the need for fewer panes, with pane sizes eventually becoming more or less uniform. Later, the larger cylinders blown increased the sheet size to 47×32-in. (120×81 cm), which for the Crystal Palace (see 1851) produced three panes measuring 47×10-in. (120×25 cm). Thickness could also be varied from the generally acceptable thinnest of 16 oz. to 42 oz. per square foot making sheet glass considerably more adaptable.

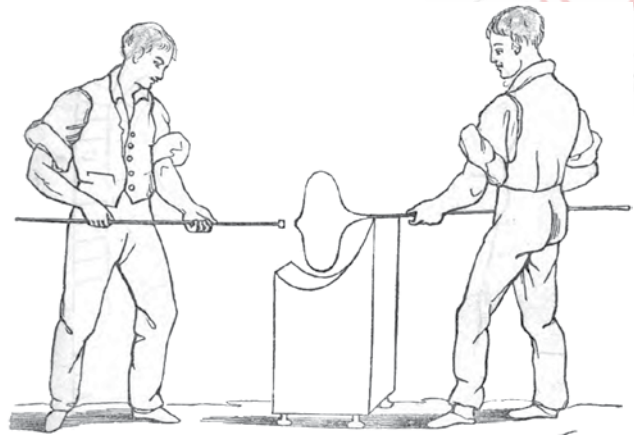
The only problem associated with sheet glass was that although the panes of sheet glass were a more uniform thickness, they were more susceptible to striae: the streaks found in glass due to the manufacturing process.

Quality sheet glass was determined by several skills:

Gatherer: if insufficient glass is gathered, then the cylinder would be smaller or thinner.

Blower: the most crucial – gauging the thickness of the glass was a skill that was not mastered easily, as was blowing it to the correct length and diameter.

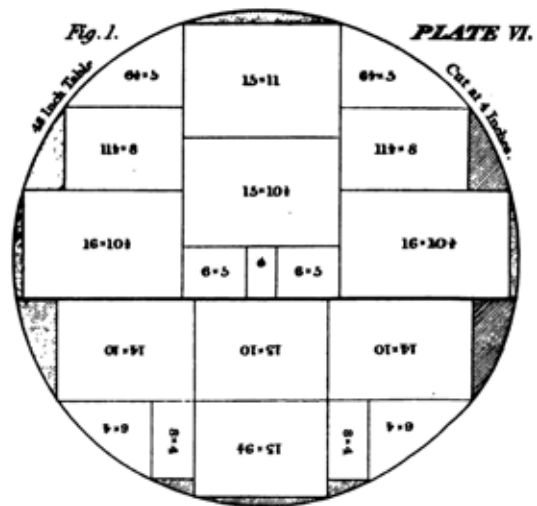
Flattener: careful flattening ensured the sheet was not “cockled” (wavy or uneven)



The crucial stage where the punty rod (left) is applied to the centre of the partially blown crown disc

A suggested markup for a 48-in.crown disc. Note how some parts of the curved outer were used.

The Crown Glass Cutter and Glazier's Manual, William Cooper



Examples for 50-in. (1.27 m) Crown

Panes	Size (in)	Panes	Size (in)
2	15×13	2	15×13
2	17×11½	1	11×9
1	11×8	2	7×5
1	10×8	2	6×5
2	6×4	1	10×7
2	6×5½	—	—

THE FIRST FRENCHMEN

Note: The conversion of the French currency (franc) to the UK currency (of 2023), is based on the amount of certain consumer goods that could be purchased, which is effectively the Retail Price Index used elsewhere in this book.¹²⁷

In the summer of 1832, Lucas left London and took up residence at New Inn Hall, Handsworth, Birmingham, a borough adjacent to Smethwick, which enabled him to directly oversee the British Crown Glass-Works Co.¹²⁸ In August of this year No 2 Furnace, built in 1824, was set aside specifically to manufacture sheet glass at Spon Lane. This eventually became known as the French House when it was allocated purely for the French blowers to create shades and sheet glass.¹²⁹

Although there were several advantages of sheet glass over crown glass, the major problem was that the multi-part process was only known by the French, who jealously guarded the secrets. This forced Lucas to hire French sheet glass workers and a few Germans and Belgians. Inevitably, the French workers commanded a far higher wage than their British counterparts.

Enlisting these workers was a covert process as they could be imprisoned for disclosing the trade secrets of sheet-glass making. The French authorities, reluctant to see valued workers leaving for England, made sure that Lucas's agents would also suffer this same fate should they be caught. Georges Bontemps initially acted as an agent to Lucas, recruiting French and Belgian glass workers to work at the Chance factory, much to the chagrin of James Hartley, who was opposed to the new style of glass making.

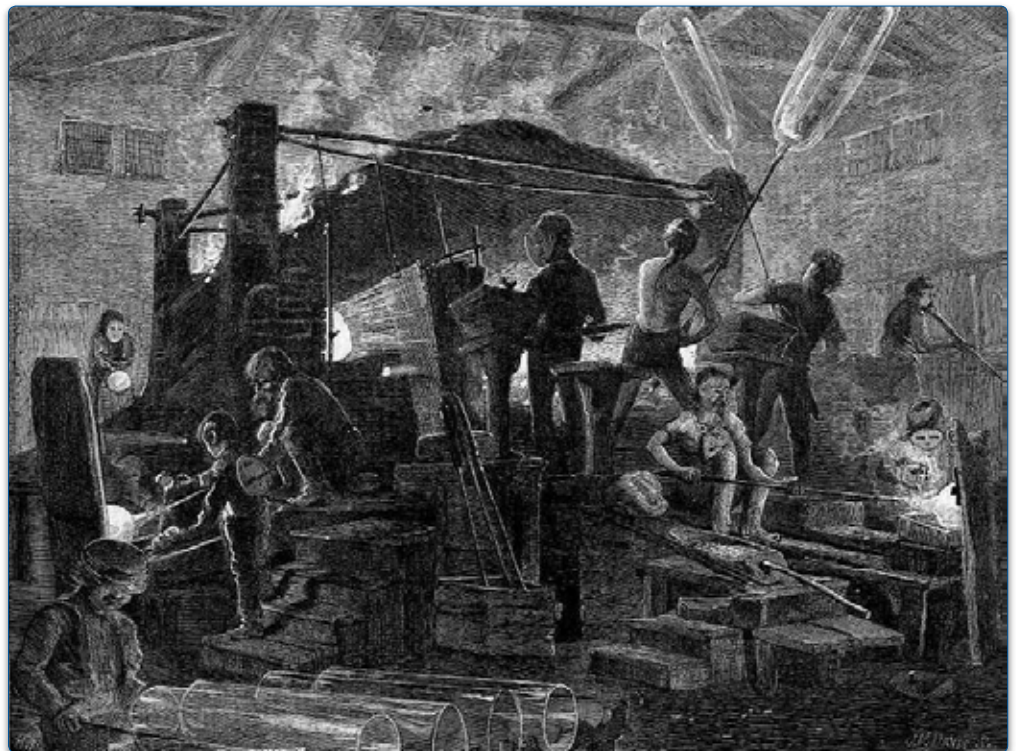
The first Frenchman employed at the British Crown Glass-Works Co. was Nicolas Gaspard André (1802–1871) from the Ardennes region of France, who is recorded as starting at Spon Lane in 1828, a date which preceded the manufacture of sheet glass. “Big Gaspard” as he was always known finally left Spon Lane in 1850 with a handsome pension. Gaspard in these earlier years was probably making glass shades for the Company. Two brothers-in-law Gaspard “Caspar” André and Jean-Joseph André also joined the Company soon afterwards.

Nicholas later wrote his memoirs on his experience working at Chance Brothers, where he earned as much as £60 [£5,670] per month, with a general wage of £10 [£945] per week. He was, according to a description written by his son, a very imposing man, ‘a splendid specimen of manhood of more than six feet high and known as “Big Gaspard”’.

Jean-Joseph André was unable to withstand the rigours of glassblowing but he took up a position as a glass agent at Jumet, near Charleroi in Belgium and later acted as a scout for Hartley's, to encourage Belgian workers to work there. The two other Frenchmen continued working at Chance Brothers and accumulated massive sums of £5,000 [£556,951] and £3,000 [£334,170] respectively by the time of their retirement.¹³⁰

To induce glass workers to move to England from Belgium and France, Lucas Chance offered higher wages than the men could have earned in their own country. This did not go well with the managers at Charleroi who did all they could to prevent them from leaving. Despite this, a steady stream of French and Belgian workers flowed into Spon Lane.

Working conditions were harsh for glassworkers and a shorter life expectancy was expected. In this US engraving, the cylinders are being swung to lengthen them





The initial wage offered by Chance was 50% higher than the Belgian tariff, but this altered over time and in August 1833 Bontemps recommended a blower at a rate not exceeding 12 centimes [£0.64] per cylinder. As a guide, for each *journée* (day) the blower was expected to blow at least 120 cylinders, therefore earning about 76.80 francs a day [£465], which was a high wage at this time. As was customary with the French, the blower paid his *gamin* (kid or boy) from his wages. Soon after this, the men were paid by the month at a higher rate. Later still, in January 1836, it was reported that Meyer – one of the top blowers, with the nickname *le grand* (the great) – was contracted at 400 francs [£2,040] per month.¹³¹ By 1845, when the excise duty was repealed and demand for sheet glass increased, the competition was fierce for the best foreign workers. The best glassworkers '*had to be paid*' 500 francs [£2,416] a month for a 30-hour week and 600 francs [£2,900] for a 40-hour week.¹³²

Much like crown glass blowers, the sheet glass workers also worked in a team. Each blower worked his pot assisted by the flattener and the *gamin*; the latter assisted by gathering molten glass on the end of the pontil rod and forming the parison, in preparation for the blower. The flattener had a separate skill, which was cutting down the length of the blown cylinder, reheating it and flattening the malleable glass onto a special table.

Although virtually all the French refused to disclose their methods of working, in one instance two flatteners agreed to teach Englishmen their art for no less than 10,000 francs [£53,000]. In retaliation, the Chances & Hartleys managers offered 1,500 francs [£8,000] and a warning that they would be reported to Bontemps for insubordination in the event they refused, and then replaced by fresh workers.

It was one thing to employ foreign workmen, but another to manage them. Despite high wages and short hours, the foreign workmen were dissatisfied with their surroundings, came to work late, left work early, blew their cylinders short of weight, and with an excessive proportion of breakages.¹³³ British Crown Glass-Works Co.'s agent, John Reynell (1809–1873), advised that whilst at Charleroi, Gaspard André – considered to be the best of the French workers – often blew thinner cylinders to increase the number produced. A further minute dated 2nd August 1833 claimed that it was in the men's interests '*to produce as little glass as possible*'.¹³⁴ In 1860, according to Mary Bayley, the temperance campaigner who wrote about working conditions, '*one of the gentlemen of the firm of Chance Brothers & Co.*' (assumed to be one of the partners), reported that the French had settled to working more conscientiously:



The dashing and intrepid John Reynell, c.1835, who operated as a European agent from 1832–1834, encouraged much overseas trade for Chances & Hartleys

*We have both French and Germans amongst our workmen; in some particular departments they suit us better than the English. In one respect they are greatly their superiors; they not only do their work well, but can take care of themselves while doing it.*¹³⁵

Bayly also noted that one Frenchman, almost certainly Gaspard André, was paid £10 [£1,006] per week, which was an extraordinary sum to receive and the equivalent of about £900 [£90,549] per annum.

It was not long before other glass manufacturers started to take an interest in manufacturing sheet glass, being a far quicker and uniform process, with far greater profits. Although production of sheet glass at Spon Lane was not truly refined until about 1838, the first to attempt manufacture after Chance was, ironically, the Hartley brothers in 1838. They were soon followed by Cooksons in Tyneside and Greenall & Pilkington in St Helens, later known as Pilkington Brothers. With Chance Brothers in the driving seat, a meeting of the companies took place in August 1841 to agree on quotas, where it was agreed that '*the production of none of these firms was to exceed half that of Spon Lane.*'¹³⁶



Eventually, the foreign sheet glass workers filtered out from Spon Lane and sought employment at the other glassmakers. Abraham Hartley, a distant relative of the Hartley brothers, recalled a Frenchman who originally worked at Spon Lane, named “Legget” who sought employment at Hartley’s. This may have been Jean-Baptiste Leguay, who was known to be working at St Helens in 1841.¹³⁷

From the onset, Lucas wanted to eventually replace the French workers with Englishmen, but with the French and Belgian workers operating a closed shop, this could not be achieved. They refused to work alongside other nationalities and insisted on having their own glasshouse to safeguard their methods; Glasshouse N° 2 was chosen for this purpose and became known as the “French House”. Eventually, financial incentives broke through this self-imposed monopoly, but it was a long slow process and for many years a considerable number of foreigners were kept in employment at the firm. At Hartley Brothers, Abraham Hartley wrote that their secret was no more than a knack and that English workers soon picked it up.¹³⁸

The French “secret” was no more than plain water. What was assumed to be the drinking of water by the French glassblowers just before blowing a cylinder, was the fluid being retained in the mouth and blown into the bubble of molten glass at the end of the pontil rod. Following this, the blower swiftly blocks the pontil tube with his thumb. The trapped air and fluid vaporised in the intense heat, which caused the bubble to swell to a greater extent than could be achieved by sheer lung power. A very simple trick but not a skill.¹³⁹

One could also question why the blowers could command such a high wage. Glassblowing was known to shorten lives and their reasonable argument was that the severe working conditions could contribute towards this.

Despite all the efforts to control and appease the French workers, it was noted in 1834 that they made their cylinders short of weight; that is, with the correct dimensions but thinner walls. The blowers at N° 2 Furnace at this time were Gaspard and Joseph André, Desguines, Stengre, Felix Bournique – these five were employed from the start – plus Meyer, Reppert, Villard. Zeller, Rappert, Cresset.¹⁴⁰

Stengre and Cresset blew sheets that were 40×30-in.; Gaspard André various sizes, including *lagres*; others blew sheets varying from 36-in.×23–28-in. The size disparity could not be tolerated by the Firm and a remedy was devised to pay the workers for what they produced, and cylinders short of weight would be rejected. Unsurprisingly, this proved ineffective as the workers defied management and still produced sheets of 11–12 oz. per foot (thinner glass), instead of the regulatory 14–15 oz. To demonstrate the Company’s displeasure

to the other French workers, the management dismissed Zeller in January 1836 ‘as an example’ and replaced him with “le grand” Meyer.¹⁴¹

A *lagre* is a perfectly flat sheet of plate glass that is placed between the flattening stone and the cylinder being flattened.

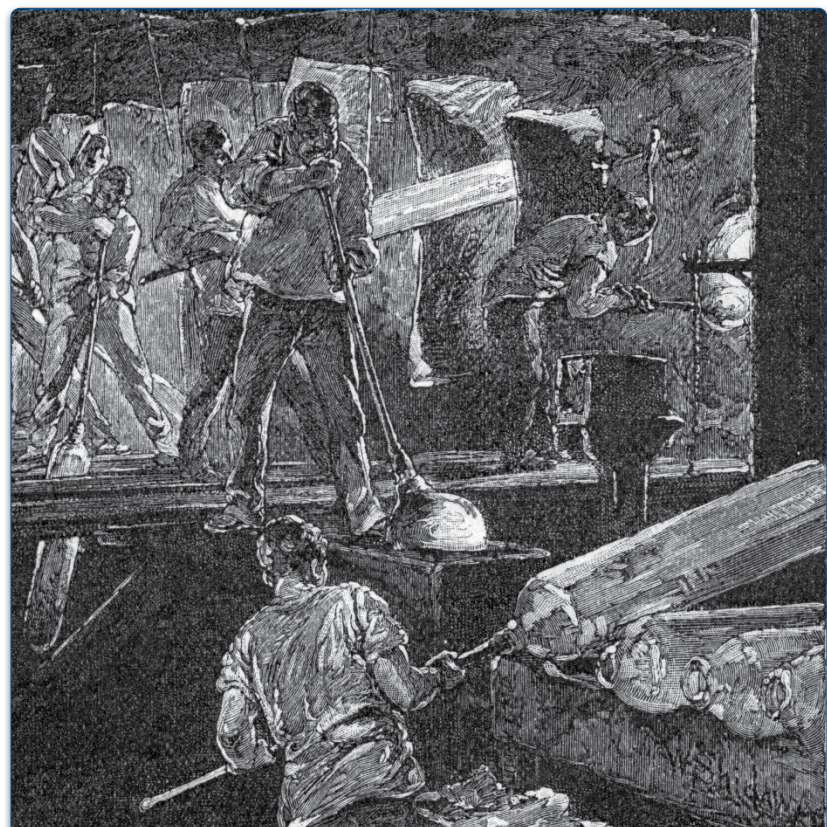
The influence of the French and Belgian workers in both the workplace and local community was also evident. A day’s work became known as a *journée*, French for daytime, and was anglicised to journey. The boys employed to help the glassmakers were known as *gamins* (tr. kids). To house this fresh influx of workers, a row of cottages in Neal Street, to the north of Union Street, was purchased by Lucas for housing the workers that became known locally as French Row, although its official designation was Belgium Row.¹⁴²

Due to the proximity of workmen around Spon Lane, there were reports of street fights between English and French workers, but the foreign workers did integrate within the local community, with some marrying English women and remaining in the country after their contracts had expired.

The French even introduced the custom of eating the legs of locally caught frogs to the Spon Lane area, with many English workmen acquiring a taste for them and for a time they became a popular dish.

Sheet workers in full flow

Archive.org



ANNEALING GLASS

After molten glass has been formed, the annealing process allows the glass to cool slowly to prevent stress cracks from appearing.

From 1830 until 1836, the amount of sheet glass produced increased from about 14,000 to 18,000lb per week (6,350 to 8,164kg). This increase could not be maintained and by 1837 production had fallen to 15,400lb (6,985 kg) and by 1838 to 14,800lb (6,713 kg). One problem was that once the cylinder had been blown, two of the main processes, flattening and annealing, took different times to complete. Flattening required the glass cylinder to cool, enabling it to be split before being reheated for the flattening process. Annealing required a constant cooling environment. Other companies in Europe addressed this problem with solutions from Hutter & Co. in the Rive-de-Gier region and Houtard (see p.69 & 85).

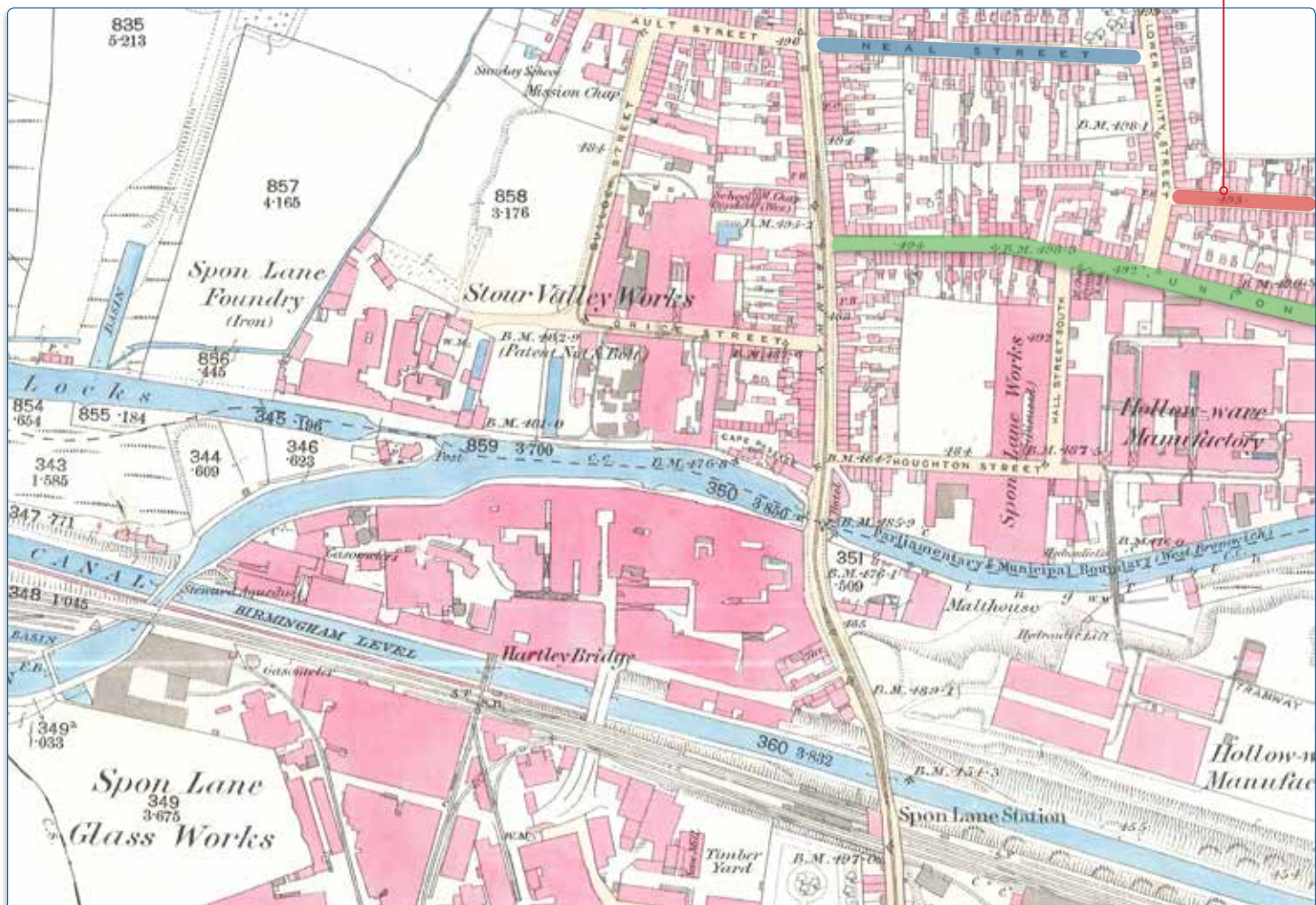
A method called the "Lyons kiln" had been tried at Spon Lane in 1833, which resembled the Hutter process but was abandoned as a failure. The Houtard experiment came under consideration in 1835 and proved to be a worthy method, except that it required a boy to be placed inside the kiln to unload the "chariots" carrying the glass cylinders. Intervention by the Excise officers, however, meant the kiln had to be locked and sealed, and obviously it was dangerous to leave the lad locked in the kiln. This caused a legal protest and counsel felt that a 'new law or order, either from the Board of Excise or Treasury' was necessary to circumvent the problem. The outcome of the legal process is unknown but, in all probability, it was ratified.

Meanwhile, increasing competition from glass manufacturers north of the Tyne placed a sense of urgency into starting the trials, as the quality of sheet glass was improving. Unfortunately, even though the Houtard process was laudable, James Hartley disapproved and experiments were not resumed until after the Hartley brothers had left Spon Lane.¹⁴³

Union Street, shown in green. Neal Street, just to the north, is shown in blue and was often referred to as French Row by the locals due to the concentration of French and Belgium glassworkers living there.

Map courtesy Chance Heritage Trust

Glover Street, shown in red, is also north of Union Street, but is a less likely candidate for French Row

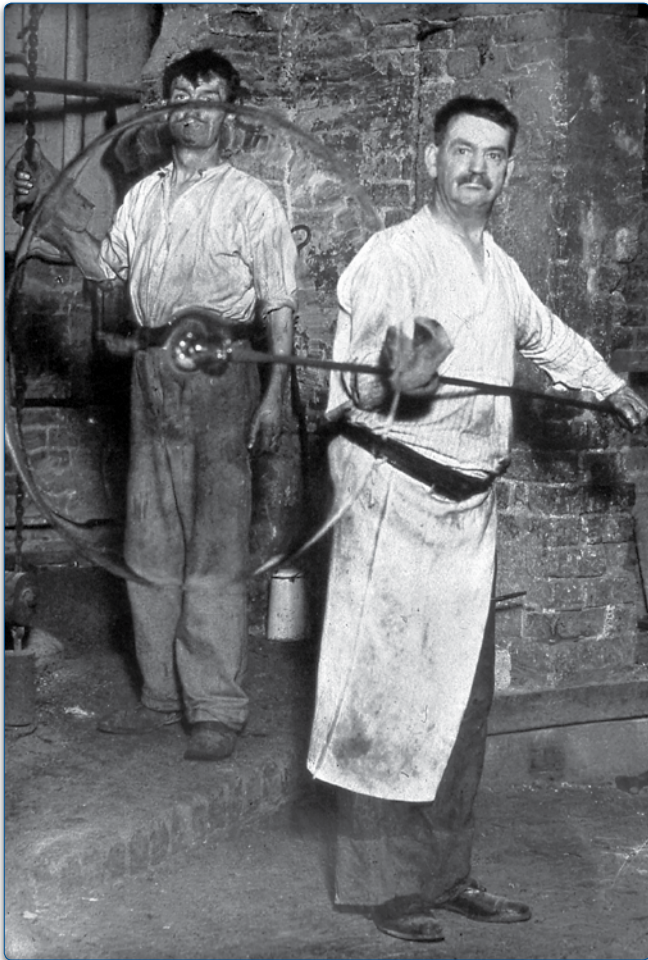


THE GERMAN WORKERS

There was not a complete monopoly by the French and Belgians in making sheet glass. The exception was two Germans who were employed at British Crown Glass Co. Their approach was different to the French: the difference in the manufacture of sheet glass – along with the attitude of the workers – was quite significant. While the French blew their cylinders long, the two Germans blew wider and squatter cylinders. The Germans were highly conscientious, worked longer hours and undertook “skimming”, where the scum on top of the glass was removed at regular intervals resulting in a much cleaner finish to the cylinder.¹⁴⁴

Despite being diligent, the Germans were slower than the French and required more furnace time that inevitably cost the Company money. Reynell suggested that more German workers should be hired and a second sheet furnace for this purpose was planned, but they could not (or would not) conform to the preferred French method of working and so they departed in the early part of 1834.

The Germans did, however, leave behind a legacy that improved the skimming. This involved placing clay rings in the pots on top of the molten glass, which kept debris to the outer sides, concentrated a better-quality glass towards the centre and thus improved the quality of the cylinders. After a few trials, by the end of 1834, they were in partial use across all the houses.¹⁴⁵



THE BRILLIANCE OF CROWN GLASS

The quality of glass was important to British Crown Glass. In an article written in 1834, Henry Chance observed that the value of a table of high-quality crown glass was three times that of an inferior one. Bontemps also stated that whilst the British preferred the higher-priced glass, the contrary was true in France and Belgium. In August 1833 the Company sought changes to the production technique used by the French.

On the difficulties of creating the perfect glass, one of William's (V) sons, Henry Chance, in his article explained how many different factors affected this goal:¹⁴⁶

Perhaps the glass has been badly melted and is seedy, that is, full of little vesicles, to which the rotary motion has given a circular shape; or the gatherer may have enclosed air within his metal and a gatherer's blister is the result-or a pipe blister, or pipe scales, or dust from the pipe-nose, or dust from the marver, or dust from the bottoming-hole, or dust from the nose hole, or dust from the flashing furnace, or bad bullions, or scratches, or music lines may disfigure the table, or the glass may be crizzled, or curved, or bent, or hard, or smoky, or small, or light, defects to explain which would be a long and dreary task.

Bontemps noted that Chance Brothers was not that profitable until the competition increased from other manufacturers.¹⁴⁷ This might reflect on the French workers having to accept lower wages and longer hours.

High-quality crown glass was still the superior glass and supplied to British consumers who demanded small, high-quality window panes. Meanwhile, lower-grade crown glass was shipped to British possessions, such as Ireland, which were protected from foreign competition. The two lowest grades of glass were referred to as “Coarse” and the even lower “Irish” glass grade.

EUROPEAN TRADE

The Firm's export of crown and sheet glass to Europe was undertaken by John Reynell who in early 1833 travelled with James Hartley to Charleroi in Belgium. While there, they succeeded in establishing a good relationship with Msr Houtard of Mariemont (1802–1876; François Emmanuel Henri Houtard-Cossé), the acting partner of ‘probably the largest glass-works in Belgium’ and Msr Drion of Jumet, the chief proprietor of the glass-works in Valenciennes. Reynell noted that the duty on Dutch imports from Belgium increased the price between 5% and 25%, raising the possibility of sales to Holland and, further, to the Dutch East Indies and elsewhere in the East.

Spinning a crown disc. The brilliance and clarity of the glass is evident from the photo. Also note the small bullion

The Belgians were nonetheless very productive in manufacturing sheet glass. At Jumet, there were 22 pots that over a five-day week produced 66,000-ft² (6,131 m²) with an estimated 17,472,000-ft. (5,325,000 m) a year from the eight factories in the country. Compared to this, Drion estimated that there were 'three to four times' more factories in France than in Belgium.¹⁴⁸

Attempting to compete with Belgium abroad proved to be a non-starter. Its "*demi-blanc*" sheet glass was sold in Antwerp between 12s 6d to 14s 6d [£62.50–£72.50] per 100 feet; 5s to 7s [£25–£35] cheaper than similar glass from the British Crown Glass Co.¹⁴⁹ *Demi-blanc* (tr. "half-white") in this context did not mean semi-opaque white glass, but a medium quality clear glass.

Houtard was especially useful to Chance as he had developed a device for flattening glass and was later invited to Smethwick where he was favourably impressed with the quality of the crown glass. Houtard also disclosed that the alkalis and coal were much cheaper in Britain, giving yet another glimmer of hope for the Company's future exports. The one fly in the ointment being Houtard, who was apparently '*very jealous of and to distrust Bontemps*'. Because of this, he would not reveal his new invention until he was convinced that Bontemps was not a partner at British Crown Glass Co.¹⁵⁰

An early pane of crown glass, predating 1834.
Note how the green colour is accentuated
by the mass of glass at the bullseye



Hartley returned to England, via the glasshouses in Paris, while the ever-adventurous Reynell travelled to Bavaria and western Bohemia, two regions with thriving glassworks. These travels were undertaken in the early months of the year, necessitating a journey by horseback and sledge through mountains and forests covered in snow. He hoped that the name of the Company '*... will, I think, be pretty well known in this part of Europe*'.¹⁵¹

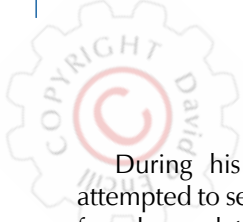
While in Bavaria he encountered difficulties in attempting to view the largest plate glass works there and in western Bohemia, he was even arrested as a spy – an incident that Reynell described as '*amusing*'. Bohemian glass, he concluded, was not a threat to the Company. A system of freemasonry by the principal workers created a high wage and thence a high price for the product, while all the raw materials had to be imported, further increasing the expense.

The pots in Bohemia were numerous: fifteen furnaces, each with seven pots, although each pot was about half the size of the French equivalent and the cylinders blown were '*wider and shorter*' than those in Belgium, which confirms the Company's previous experience with the German workers (see p.68).¹⁵²

Reynell also visited glassworks in Trieste, Austria (a free city until being annexed to Italy in 1918), then to eastern Germany for Dresden, Leipzig and Berlin. Reynell received enthusiasm for the glass in Berlin: '*An exceedingly fine city of 200,000 inhabitants, with innumerable palaces, really good glass is appreciated*'.¹⁵³ Here Reynell also learnt that other '*English travellers in glass*', had already ventured this far, offering glass at considerably lower prices than he could manage. The possible competitors were Issac Cookson and Greenall & Pilkington. He was also advised that visiting the Leipzig and Frankfurt fairs was the only feasible way to sell glass.

The higher quality glass produced by British Crown Glass Co. was not always seen as the most positive factor in some countries. Spain and Portugal were two exceptions, but most countries were keen to obtain cheaper glass: this was possibly driven by merchants in competition with each other. Continuing to Lübeck in Germany and then Copenhagen in Denmark, Reynell found no business in either city. From Copenhagen he then travelled to Petrograd (Saint Petersburg) and Moscow only to discover a trade import embargo, excepting the sale of watchglasses. Mirrors in Russia were also a state monopoly and the largest was measured at an astonishing 105×48-in. (2.67×1.22 m), although Reynell noted the inferior colour in comparison with the French-manufactured mirrors.¹⁵⁴

The Russian glass industry was founded in around 1805 and relied heavily on imported Bohemian workers who, like their French and Belgian counterparts, excluded others from learning their art.¹⁵⁵



During his travels in August 1833, Reynell also attempted to sell the low-grade Coarse and Irish glass but found complete disinterest, including in the USA which had an abundance of cheap, inferior window glass. The USA sheet glass manufacture at this time numbered about 32 factories, far more than British factories and was estimated to be producing 5,625,000 ft², valued at \$850,000 [\$32 mn = £25 mn].¹⁵⁶ Although assertions by a merchant named Huth that Londoners accepted any glass, irrespective of quality, proved to be a red herring and so by 1835, to use up this old material, No 3 crown house was used to provide fresh material for Canada and Britain. This instance, though, was exceptional and overall the Company constantly strived to increase production, quality and efficiency while keeping prices competitive. Such was the mantra to be repeated through the decades until the final closure of the firm.¹⁵⁷

Reynell's industrious performance secured contacts for British Crown Glass Co., but this was not to last. In 1834, it was being considered to make him an agent in Sydney, Australia, but Reynell then decided to leave the Company's employ.¹⁵⁸ A few years later, Reynell left for Australia, arriving there on 16th October 1838 to set up a vineyard, where he achieved considerable success.¹⁵⁹

RAPID EXPANSION IN THE 1830s

Lucas Chance rapidly extended his business and aimed largely at the export market. Meanwhile, he was finding difficulties in properly conducting the sale of glass in London from his warehouse there and its manufacture in Smethwick, although he thought little of travelling to Birmingham by a night coach and returning to London by the next. In 1824, however, a prospectus was issued for the new London to Birmingham Railway and in 1825, Lucas was elected to the Birmingham Committee of the London & Birmingham Rail-Road Co.¹⁶⁰ Also in 1825, the Grand Junction Rail-Road Co. was formed to link

Birmingham with Warrington and then to the Liverpool and Manchester line, thereafter a line to London via Oxford and Banbury was added.

Towards the end of 1833, further expansion to the Works was proposed for furnace No 4 to make crown glass, as '*inferior crown could be made just as cheaply as inferior sheet*'. This reinforces that crown glass was still the preferred option. The pots were made large enough to produce 200 tables each, with eight pots in total. At this time, the nominal weight of a crown table was just under 9 lbs (4.1 kg), although under some circumstances a few were blown "large" (13 lbs or more; 5.9 kg) and some "thick" (15 to 16 lbs; 6.8–7.3 kg) for specific purposes.¹⁶¹

Lucas's expectations for the "metal" were that it should be:

Worked at a lower temperature, the glass would be better in quality, the workmanship would be better, crizzling would in a great degree be avoided, and the waste of metal would be less ...

The term "metal" determines a solid when in a molten or malleable state.

The furnace was eventually started on 11th December 1834 and Lucas's expected benefits were realised. The success caused discussion on whether similar procedures should be adopted for yand although this decision was eventually deferred, by February 1836 an increase in production was realised.¹⁶²

A rebuild of the sheet glass No 2 Furnace was also considered, primarily to increase the number and size of the pots. The aim was to have ten pots, with eight having a daily capacity to produce 120 cylinders of 36×24-in. (90×61 cm) with two pots set aside for making shades. However, these changes were deferred once again as new foreign workers were required; both the Germans left and several French workers were '*unwilling to renew their contracts*'.

The position of No 4 Furnace
Courtesy Sir Sebastian Chance



The Company contacted Bontemps, stating 'the urgency of our having additional workmen'. Reynell, who was in Belgium, was instructed to engage eleven workers. He succeeded in securing the services of three top-class blowers and a *gamin*, with four others in mind, and two from Strasbourg, a city on the Rhine bordering France and Germany. On attempting to engage workers at Rive-de-Gier in central France though, he was faced with prosecution by the authorities and barely escaped imprisonment. However, with new workers engaged, No 2 furnace was restarted in the summer of 1834.¹⁶³

SHADES

By October 1834, No 2 Furnace was changed whereby a separate furnace was built purely for finishing the larger shades, as the larger holes needed to manufacture them were found to harm the metal due to a significant drop in heat.

Lucas had discovered from George Bacchus in London, a well-known flint glassmaker, that they used what is termed a "glory hole" to make their shades. This idea was adopted in September 1834 and in March 1835, the size of the working holes was ordered to vary from 10½-in. to 16-in. diameter.¹⁶⁴

The manufacture of shades was a by-product of the sheet glass worker's skill and was introduced into Britain by Lucas Chance before the manufacture of sheet glass had started.¹⁶⁵ These glass domes, sometimes with knobs applied to the top, varied in size according to their purpose and were originally used to protect foodstuffs from insects when displayed in shop windows. Later, the shade embraced the later Victorian predilection for ferns (pteridomania), which created another purpose for the humble shade, while substantially larger ones for outdoor horticulture became popular. Likewise, the practice of displaying many types of *objet d'art*, such as taxidermy, further expanded this market.¹⁶⁶

Around 1836, the Works was extended further with the addition of a gasworks and a sawmill. The offices were enlarged and a coach-house with stables was provided.

For the first time covered pots were introduced for the making of coloured glass and shades. It is mentioned that prior to this, just 'green pot-metal made in open pots' was possible. A special glass was made in open pots that was used for staining – no doubt for the creation of stained-glass church windows – and kelp frit was bought into use again.¹⁶⁷



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Claudet & Houghton advert from 1851, showing its range of glass products. The shades were very popular during the Victorian era and Chance manufactured them in a variety of shapes and sizes

Courtesy Patricia Coccoris



9 Taxes & Duties

One tax imposed upon window glass from 1696 by William III was commonly called the “Window Tax”, or to give the full title, *An Act for granting to His Majesty severall Rates or Duties upon Houses for making good the Deficiency of the clipped Money.*

Another imposition was Excise Duty, which was levied on all glassmakers on the amount of glass it produced. Over the years the power of the excise men grew to an extent that it seriously inhibited the workings of a glasshouse, and many other industries.

As many industries relied on coal as a source of fuel this applied an indirect duty on the coal it purchased, raising prices further for the consumer and swelling the coffers of the Treasury.

WINDOW TAX

The Window Tax was first introduced in 1696 to offset the practice of clipped money,¹⁶⁸ where unscrupulous people clipped the edges of the silver coins; the accumulation of left-over silver was then sold on for a clear profit. Later, the tax was used to fund various war campaigns.

The tax was graded according to the number of windows in the property and in 1747 it stood as follows:

Windows	cost/window	2023
10–14	6d	£4.47
15–19	9d	£6.71
20 or more	1s	£8.94

At the introduction of the Window Tax, there were estimated to be 88 glass houses in England.^{168a}

As windows were limited by cautious builders, ever aware that with careful planning the client could avoid or reduce the level of duty, the revenue owed dropped accordingly. To counter this, by 1808 the lowest band was reduced to six windows, although in 1825 it was then raised to eight windows.

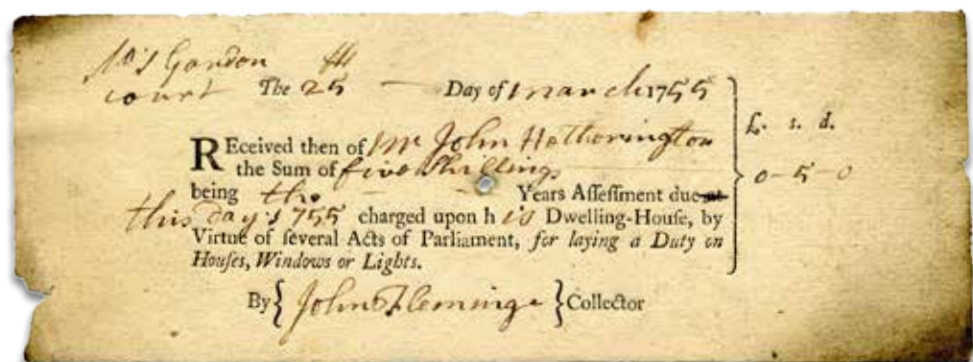
Although the minimum tax only affected those properties with a higher number of windows, conversely it penalised those people who were less likely to clip money – principally those with wealth and larger houses. Some owners bricked up less important windows and enlarged others to reduce their tax liability. Similarly, architects adapted their designs to include *faux* windows to permit their buildings to fall into a lower tax category.

Smaller houses, like tenement buildings that housed many tenants, were also built with fewer windows. This impaired the health of the occupants and may have been instrumental in the growing cases of rickets in children. Houses built after the tax was introduced may have been designed deliberately to include *faux* window arches to create a balanced design while reducing the number of windows. Tellingly though, of the estimated 3.6 mn houses in the United Kingdom in 1835, just 380,000 homes were taxed;¹⁶⁹

... so that the remaining 3,200,000, which would not participate in the benefit of the repeal, or reduction of the window-tax, would gain a direct advantage by the reduction in the price of glass

A 1755 receipt indicates the home owner, John Hetherington, had 10 windows in his house, and was charged 6d per window, totalling 5s [£4.47] for the year by the Collector of Taxes, John Fleming

Courtesy National Archives, under the Open Government License



EXCISE DUTY

Excise duty was introduced in 1746 during the reign of George II, initially as a tax on the raw materials used for manufacture. As the excise was levied on the weight of objects produced, this caused the glassmakers to respond by creating smaller wine glasses with hollow stems, leading them to be termed “excise glasses” (see photo, p.74). Others shifted their manufacturing focus to Ireland, which was exempt from duty.

The amount of excise duty paid by British Crown Glass Co. in 1832, exceeded that of all the Birmingham glassmakers combined, although the five Birmingham factories produced more glass than the combined eleven Stourbridge glassworks.

The delightfully named *Thirteenth Report of the Commissioners of Inquiry into the Excise Establishment and into the Management and Collection of the Excise Revenue throughout the United Kingdom*, covered the period between 19th February to 10th September 1835 with Volume XXXI covering glass and its manufacture.

The complexity of the 13th Report on excise duty, which spread over many pages and volumes, would bewilder the average person. It claimed that,

it is found by experience that the remaining duties on glass and glass wares are very vexatious and troublesome in the levying and collecting the same, and of small advantage to the Crown.

The report concluded that the duty was a burden to the companies having to administer it, expensive to maintain, while giving little back to the Government.¹⁷⁰

Additionally, ‘... the rates and duties upon glass and glass wares are too great, and that this beneficial manufacture has been thereby discouraged’: precisely how Chance Brothers were affected.

Excise duty was payable on every crown or cylinder of glass produced, rather than on what the company sold. This meant that if any glass was broken during or after manufacture, it was returned to the pot and became liable for duty a second time when a new crown or cylinder was produced. The duty at this time for crown, plate and flint was 8d [£3.50] per pound (0.45 kg). Before crown glass, the inferior broad sheet was the main method to produce window glass, but fell into disuse. Broad sheet was charged at 7s [£36.75] per cwt (51 kg); or 6.66d [£2.91] per pound.¹⁷¹

With the tax being calculated on the weight of the window glass produced, this favoured crown glass as it could be produced much thinner than the less manageable sheet glass, which was about 40% thicker. This, and the superior finish of crown glass, may have been the reason why sheet glass was slow in being adopted by English manufacturers.^{171a}

Once the tax was repealed, the advantages of sheet glass became the glass of choice. Crown glass became the less desirable product, although it was still the only method that excelled with microscope glass.

A possible example of “tax dodging” in Albert Street, London, where the house was probably built with bricked-up windows to minimise the effects of the Window Tax.

It is shown that corner houses were worst affected, by having more windows on the frontage. What is not clear from the photo is the number of windows used for the basement

[Wikipedia.org](https://en.wikipedia.org/wiki/Window_tax)



DRAWBACKS

For the export of glass, a complex rule was applied under the heading “drawbacks”. This was a tax based on the weight of “tables”, covering Crown glass or German sheet glass. The tariff was determined at £3 13s 6d [£362] per hundredweight (45 kg).

Glass made for export was applicable for a refund in duty (the drawback). Needless to say, even that simple phrase became mired with legalese. The imported glass was subject to excise duty and on top of the duty, an additional 8s 0¾d [£3.53] per cwt was levied.¹⁷²

This benefitted British Crown Glass Co. once it started to export sheet glass. As the law was designed around the manufacture of crown glass, which was inherently wasteful, then the duty payable on sheet glass resulted in the same tariff as crown: £3 13s 6d per cwt., which equated to more than double the cost to manufacture. An example of this “gift” from the Treasury, in 1833 this amounted to £1,267 2s 8d [£133,202].¹⁷³ Eventually, though, the Treasury reduced the Drawback to compensate for the manufacture of sheet glass.

The amount of Drawback over successive years for all companies across the United Kingdom, between 1830 and 1834 is as follows (with relative values for 2023):

Year	Amount £	[£ in 2023]
1830	181,486	17.1 mn
1831	203,764	17.5 mn
1832	188,760	17.5 mn
1833	216,212	21.3 mn
1834	257,885	27.7 mn

THE LEVEL OF DUTY

The amounts of duty the government collected were massive. In 1824, £399,660 16s 10d [£30.86mn] was collected from all British companies just for Crown and German sheet glass. By 1834 this had topped £500,000 [£53.77mn]. The contribution made by Chances & Hartleys to the Treasury was listed as follows:

83	William Chance	Spon Lane	£24,302 0s 9d
84	William Chance	Do.	£4,044 19s 0d
85	William Chance	Do.	£25,635 1s 9d

The three different entries probably represent Sheet, Broad and Crown glass respectively. This gives a total of £53,982 1s 6d [£5.68mn] paid by Chances & Hartleys from the total amount of £868,257 9s 0d [£91.28mn] from all glass manufacturers for that year. Extrapolated further, it represents about 6.2% of the total amount paid by all manufacturers of all types of glass or 10.7% of all Crown and German sheet glass producers. Not surprisingly, the Company (erroneously named William Chance) was already the second largest manufacturer of glass products, eclipsed only by Isaac Cookson & Co. in Newcastle-upon-Tyne, which paid about £68,000 [£7.15mn] of excise duty to the Government.¹⁷⁴

An “excise glass”, c.1750 with a hollow stem: less weight meant less duty
© Alex Smillie, Exhibit Antiques

A 1754 cartoon promoting the repeal of the Window Tax



Following the *Thirteenth Report of the Commissioners of Inquiry* in 1835, J. F. Chance pulled no punches in describing the duty as exposing:¹⁷⁵

... their harassing restrictions, their contradictions, their powerlessness against wilful fraud, the obstacles that they placed in the way of progress.

He goes on to demonstrate the imposition that the law had on manufacturers:

An infinity of particulars had to be registered by the officers, and everything conducted under their eyes. Four were in constant attendance at Spon Lane, besides a special inspector of glass packed for export and a supervisor to check collusion on the part of his subordinates.

Every pot at the furnaces was numbered and registered with a declaration of the weight of materials and the type of glass it produced. The annealing kilns, as mentioned previously, were locked and sealed to avoid any glass bypassing the checks being made.

The burden, no matter how harsh and forbidding, was condoned by some manufacturers, who saw it as a way to inhibit imports from foreign producers, which could otherwise impact heavily on them.

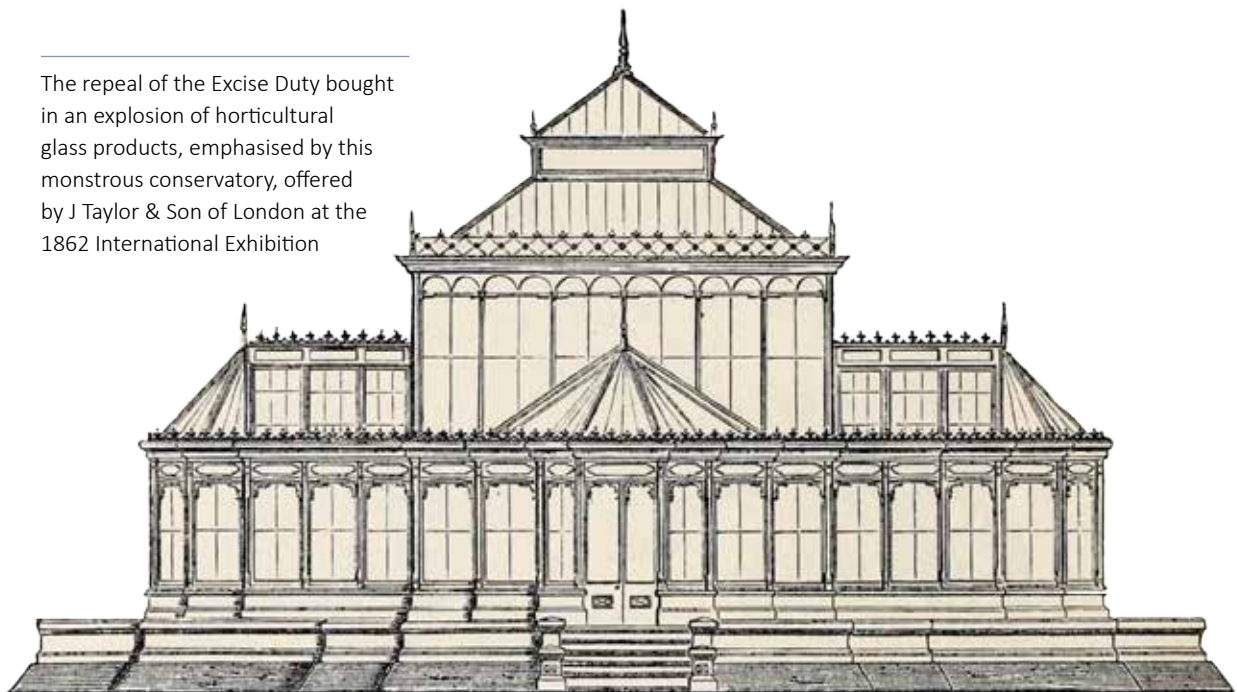
EVADING DUTY

Naturally, fraud was rife. These stringent impositions forced many of the smaller glass makers – those which produced items like toys or small bottles, such as those used for perfume – to set up illicit furnaces, even though these illegal works were vigorously sought after by the excise officers. While the penalty for infringing the act ranged from a fine of £20 to £500 [£2,100–£52,566], this did not prevent a glassworker from setting up a small furnace elsewhere. As such, the loss of revenue was calculated to be about £65,000 [£6.83 mn] a year in London alone.

Toys were small articles manufactured for decorative or utility purposes, such as buttons, beads, knobs and buckles. They were not limited to glass, but any material

Even when excise officers were in attendance, certain “methods” were used by the manufacturer to evade duty. One crown glass maker in Lancashire ‘known to evade the duties regularly’, had a removable side to the annealing kiln so that items could be removed before they reached the end where the excise officer tallied the items produced. Indeed, in evidence to the Commissioners, a Dudley MP, Thomas Hawkes, stated that he knew of such contrivances, ‘immense long forks’, to illegally extract items from the lehr. Another practice was to export glass as being valuable to claim the drawback, and then re-import it as worthless and free of duty.¹⁷⁶

The repeal of the Excise Duty brought in an explosion of horticultural glass products, emphasised by this monstrous conservatory, offered by J Taylor & Son of London at the 1862 International Exhibition



PENALTIES FOR EVASION

It is probably not surprising to learn that evasion was rife amongst the smaller "single-pot" manufacturers, but while under examination by the Commissioners of Excise Duty, Lucas mentioned the 'one house in Lancashire' that had already been caught twice and described as being 'notorious smugglers' by the Excise Commission of 1835.

The penalties levied on this house had been considerable; one of £5,000 [£471,000] in around 1829 and another 'for a smaller sum' about 1833, although these penalties still did not deter the perpetrator.

Exactly which manufacturer this was is unknown, but the penalty was almost certainly for avoiding duty by contriving to remove glass from the annealing lehr after it had been locked by the Excise Officers (see below).^{158a}

Other more serious penalties that were discovered by the officers sometimes meant imprisonment. This was probably used as a last resort should the perpetrator being unable, or unwilling, to pay. In one exceptional case, where the defendant was charged with removing glass before it had been weighed, 'in connivance with the officer', the verdict went in favour of the defendant.

In giving evidence to the Commissioners of Excise Enquiry, Lucas revealed that,

in London, I believe, there is an amazing deal of fraud among little people, but among the manufacturers I do not think it is so well ascertained as it is surmised; but many respectable manufacturers think that very large frauds take place.

However, as shown in the following chart, the penalties issued were limited to just a few companies and were inconsequential to the overall glass trade.

EXCISE DUTY INHIBITIONS

The idiocy of the excise duty made it virtually impossible to experiment in making lenses. Lenses made using thicker crown glass, which was necessary for an achromatic lens (see diagram opposite), were penalised by the intervention of the excise officials, who stipulated that plate glass could be no thicker than one-ninth-of-an-inch (2.8mm). The optician and lens maker, John Dolland, was forced to obtain leave from the duty to get crown glass made for him at Spon Lane, but while he gained permission from the Treasury to continue experimenting, he was forbidden to do so by the excise supervisor. Also see p.72.

Optical Crown glass should not be confused with Crown window glass

Cookson & Co. were also inhibited by the law for their construction of a Fresnel polyzonal lighthouse lens. Sir David Brewster had managed to get some plate glass made for lenses, but even he was limited to a thickness between $\frac{1}{8}$ -in. and $\frac{5}{8}$ -in. (3.175 mm and 15.87 mm).¹⁷⁷

Absurdity followed idiocy. A bottle maker named Frederick Fincham worked out a process to manufacture his green glass bottles so that they were fit for containing acid. The problem with Fincham's bottles was that being so good they could not be distinguished from flint glass. This, according to the pedantic excise officers, could then be used as a replacement for bottles of a higher value, yet only charged at the lower rate of duty. Adding illogicality to absurdity, the maximum allowable size for a bottle was just 6 fl.oz. (0.3 of a pint; 170 ml).¹⁷⁸

The annual penalties levied for evading excise duty between 1832 and 1834

Number.	Offence.	Amount of Penalty.		
		Awarded.	Recovered.	Remitted.
	Year 1832.—ENGLAND.	£. s. d.	£. s. d.	
1	Opening by art and contrivance four annealing arches after having been locked by the Officers	2,000 0 0	2,000 0 0	
	SCOTLAND and IRELAND	Nil.	
	Year 1833.—ENGLAND.			
1	Entering broken or waste Glass for exportation on Drawback	100 0 0	100 0 0	
	SCOTLAND and IRELAND	Nil.	
	Year 1834.—ENGLAND.			
1	Removing Glass before the Duty was charged	28 0 0	28 0 0	
2	Ditto Ditto	25 0 0	25 0 0	
	SCOTLAND and IRELAND		Nil.	

EXPERIMENTATION, 1835

By 1835, the report to the Commissioners of Excise Enquiry showed that the rules on experimentation with glass had been relaxed, as shown by Lucas's evidence:

... we can make any experiments we think fit without any interference on the part of the Excise; we are one of the most experimental houses in the trade.

Checks by the officers were mainly confined to glass exiting from the annealing kilns, although checks to gauge the pots were still implemented. Lucas considered the checks highly inconvenient, but duty in 1835 was only applied to glass that was manufactured.

While these taxes and duties were still largely seen as a deterrent to progress, Lucas added a third glasshouse in 1828, and another in 1834 when Furnace N° 4 was built. The rest of the site largely remained open country.

PLATE GLASS

While ordinary window glass was subject to high levels of duty, at the time of the 1835 Excise report plate glass enjoyed a lower burden of duty: plate glass was £3 [£315] per cwt., yet for crown glass it was charged at £3 13s 6d [£386].

The high-quality plate glass was incredibly expensive to manufacture and required many man-hours to produce a luxury item that few could afford. By 1835, there were only two companies producing plate glass. Cooksons, which had the largest share of the market, with relative newcomers, the British Plate Glass Co. in Ravenhead entering the market in about 1815.

With James Chance's breakthrough invention in 1838 (see Volume 2), plate glass became more affordable and was soon adopted by many other companies.



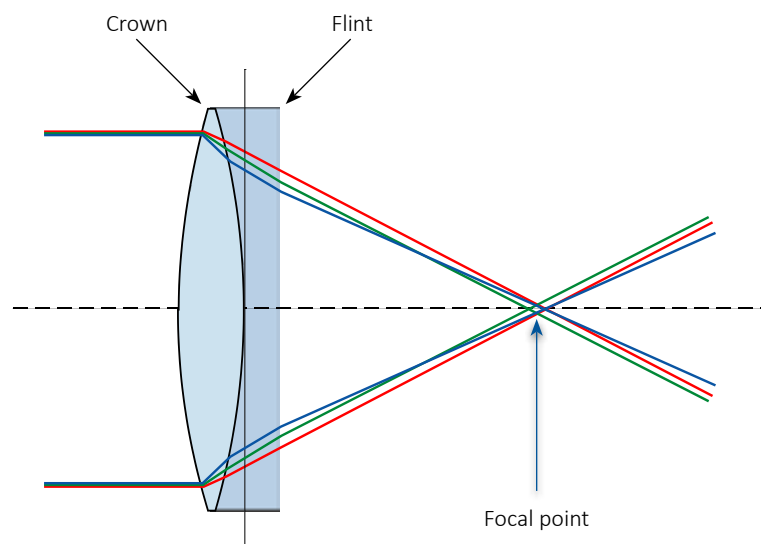
The effect of chromatic aberration is clearly demonstrated by a bullseye (plano-convex) lens, where colour tinges are seen around the black text

Achromatic Lenses

As light enters the crown lens, each of the different wavelengths of light – red, green, blue – bend (refract) at slightly different angles.

To mitigate this effect, the concave flint lens partially straightens the light so at the focal point of the lens (where the lines converge) there is very little overlap. This reduces chromatic aberration

Adapted image courtesy of "DrBob", Wikipedia





10 The Glass Trade

The last chapter (XIV) of J. F. Chance's book was given over to Walter Chance who explained the intricacies of the Glass Trade and the Associations in which British Crown Glass was involved from 1827.

Lucas joined the Association of Crown Glass Manufacturers of England and Scotland, and regularly attended its meetings. In 1830 he was appointed by the Association to chair a special committee formed to press the government for changes in the excise duties, which inhibited the profit of glass manufacturers. This action may have been responsible for a future reduction of excise duty.

ASSOCIATION OF CROWN GLASS MANUFACTURERS

The Association came into being to protect the interests of its members. The members met twice a year to discuss price regulation, crown glass sales, prohibiting the employment of other members' workpeople, establishing penalties for breaches of rules, and altering production to meet demand. Although the position of Chairman was on an annual rotation, Lucas's influence was such that many of the members considered him to be *'the leader of the trade'*.¹⁷⁹

In 1830, Lucas was appointed Chairman of a special committee to present the Government with various proposals on the cessation of Window Duty, including an *'instructive letter'* to the Chancellor of the Exchequer, and in 1831 he also signed a Memorial that was represented by the entire trade. His involvement was seen in a "Fines Fund" of £100 [£9,451] per manufacturer that was deposited in the names of Lucas, with John Clare and Richard Pilkington. Lucas was often lobbied by glass merchants to speak on their behalf to his fellow members,¹⁸⁰ and his support and influence were invaluable to the smaller glassmakers and merchants.

The Association and its members saw regulation as a means of controlling the market. Another aim was to make crown glass more desirable through an assumed demand; *'the unanimous opinion of the manufacturers that a restriction of make is expedient'*. In October 1838, it decided to restrict the production of crown glass to 1.5 mn tables for the entire industry. Each manufacturer was allotted the number of tables they were allowed to produce, based on the duty each had paid over the previous four years. One exception was that the minimum manufacture was 1,200 tables per week. This was followed in August 1839 by a further 10% reduction in manufacture and in August 1841 the making of sheet glass was restricted.¹⁸¹ By this time, Chance Brothers was in the ascendancy and seemingly setting down the rules, as demonstrated by a memo:

- The Inspector shall deduct 10% from the quantity of Crown glass made by each House [for 1840] and the remainder shall be considered the established quota ... from 5th July 1841.
- He shall also deduct 10% from the quantity of Sheet glass made by Messrs. Chance [for 1840], and that shall be considered their quota of Sheet glass.
- Messrs. Cookson & Co., The St. Helens Co., and Messrs. James Hartley & Co. shall be allowed such a quantity of Sheet glass for each of their quotas respectively as shall not exceed half the quantity allowed to Messrs. Chance.

Although the Association forbade any member to transfer their quotas to another maker, in 1842, Chance was allowed to make *'one-eighth more than their allotted share of sheet glass'*, while Cooksons exchanged 2,000 cwt (100 tons) of sheet glass for 1,250 cwt (62.5 tons) of crown glass,¹⁸² which was probably due to a discrepancy in demand for the respective makers.



THE LONDON OFFICE

From 1815, when Lucas started his first business venture in London at 2 Coleman Street Buildings, a link remained between Chance Brothers and the capital city until 1953. Lucas Chance often travelled to meet clients in London, Bristol and Dublin where business links led to lifelong friendships. These included James Hetley, whose company remained faithful to Chance Brothers for over a century, Maurice Brooks of Dublin and John Hall of Bristol: some fifty years after one visit by Lucas, John Hall's son recollected how Lucas had purchased a pony for him.

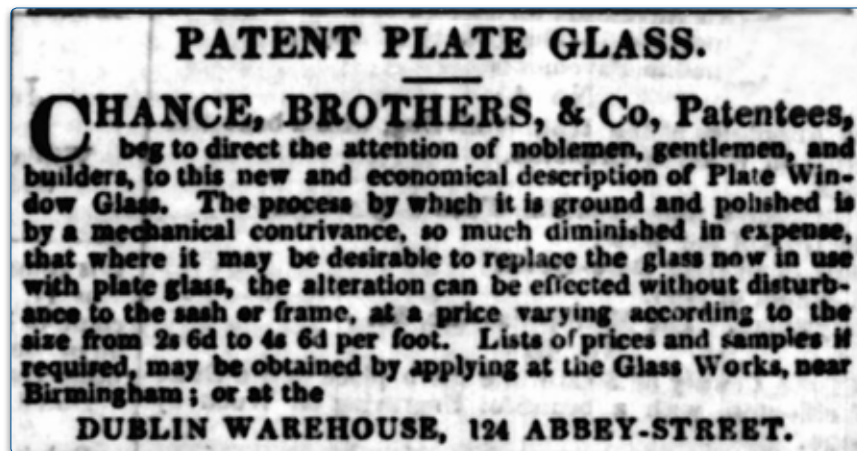
On the expiry of the lease at Coleman Street Buildings, the London office moved to nearby 24 Finsbury Circus until it was closed in 1891. Agencies were also started in Dublin, Glasgow and Liverpool. The first Dublin office was at 124 Abbey Street with Maurice Brooks acting as an agent there until he started his glass merchants and diversified into selling foreign glass.¹⁸³

SAMUEL NICHOLLS & OTHER MERCHANTS

Samuel Nicholls was one of the first pupils at Spon Lane School, and he attributed much of his learning to Frederick Talbot, the first headmaster of the school from 1845. Nicholls was then employed at Spon Lane but left service in 1862 before embarking on an epic walk to London.

Through his expertise, thrift and ability his company eventually became one of the largest and wealthiest glass merchants in the country. In 1917, when a new canteen was established at the old school premises, he returned the favour to the Company by presenting a library of volumes for the adjoining Reading Room.

Another notable employee was Solomon Cutler who became a foreman in the sheet glass warehouse, while his son, Ephraim, founded a prosperous company.



One of the first known adverts, dated 1841, for Maurice Brooks' concern
Courtesy of BL

A Thomas Brooks appears before this time in 1832, based at 108 Abbey Street, Dublin, who was presumably Maurice's father.¹⁸⁴

On 3rd March 1829, the London house at 55 Skinner Street, Snow Hill, leased by Lucas Chance, was advertised for rent. It appears that this is when Lucas finally gave up his residence in London to move permanently to Birmingham.¹⁸⁵

Another success story was Samuel Cashmore who was employed in the Home Office at Spon Lane. After being transferred to Bristol under an agreement between Lucas and John Hall, to look after the latter's company, Samuel acquired the old established John Dix & Co. to start Samuel Cashmore & Co. By 1920, this business was in the hands of the Salmond family, who also owned another glass merchants, James Hetley & Co. in London. The Salmonds were closely linked with Chance Brothers and later bought a controlling share in W. E. Chance & Co. Ltd (fl. 1872–1970; see Volume 5, 1916).¹⁸⁶

In lesser ways, Enoch Holloway, a sheet glass cutter, moved to Manchester to start his business there, which was carried on later by his son, Arthur. Samuel Evans was employed in the Ornamental Department and on leaving in 1867, started his own prosperous stained-glass business which was later taken over by the Birmingham firm of O C Hawkes. Another from the same department who struck out on his own was Thomas Camm (see Volume 4, 1867, Coloured & Ornamental).¹⁸⁷

OVERSEAS TRADE, 1829–1842

Foreign trade was carried to great effect following European tours by John Reynell between 1833 and 1834 (see pp.65, 68–70), and then by Bontemps in 1850 and 1852 (see Volume 2, 1850).

In 1829 Lucas had managed to secure sales of window glass to one of Britain's furthest colonies. Just seven years after the company started producing glass, newspaper advertisements in *The Sydney Gazette & New South Wales Advertiser*, Australia, posted by Mr M. Hindson offered Chance glass from newly imported stock in 1829.¹⁸⁸

Window glass of various dimensions, from the British Crown Glass Company, per Caroline

'Caroline' was presumably the name of the ship carrying the glass.

Trade to North America became increasingly important and large consignments of sheet and crown glass were exported to the USA and Canada from at least 1842, and advertised in the *New York Tribune*.¹⁸⁹ Australia's demands also gained momentum and in 1841 an 'extensive assortment of window glass' was being offered by H. G. Ashurst & Co.;¹⁹⁰ several advertisements were placed in Sydney newspapers from 1844.¹⁹¹ Exports were also sent to India, New Zealand, South America and South Africa.

The agent for Australia was Henry Brooks & Co. Other third-party agents acted in areas such as Egypt, India, China, the Malay States, Western Canada, Argentina, Chile, Bolivia, Brazil, Cuba and Greece. All shipments abroad were transacted through shipping houses based in the UK, such as Lucas's own London warehouse.¹⁹²

Exporting glass to the colonies was advantageous due to the loophole which was due to the drawback rebate on the excise duty when exporting glass. Expansion of the sheet glass process was initiated in 1831 to take advantage of this, which reaped sufficient profits enabling the investment to be repaid until the authorities spotted the loophole and modified the rebate (see p.74).¹⁹³

1841: An advert for the Australian importation of Chance's window glass. H G Ashhurst & Co. would deal with the import of many other goods



Poorer quality sheet glass was likely exported to the Commonwealth countries while retaining the better glass for England. Even so, in 1834 *The Sydney Gazette* reported the advantages of Chances & Hartleys' sheet glass over crown glass: thicker at 4.2 mm; improved colour; flatter; summarising it as, 'the best ever imported.' By 1835, a further view reported:

Chances and Hartley's British Sheet Glass, which is superior to Crown, being a third thicker, clear and cut.

Sizes were quoted as being virtually square at 30×25-in (76×63.5 cm) and taller and narrower at 36×22-in (91.5×55.9 cm).¹⁹⁴

The export trade and the establishment of prices depended much on the glassmakers in Europe being unable to match the prices of English manufacturers. This was restricted due to strong Belgian, French and German makers, where import tariffs inhibited British exports.

1845: Australian advert for Chance glass

Window Glass, White Lead, Oil Colours, &c. &c.

THE undersigned has just received, ex late arrivals, a large assortment of **Chance Brothers' Sheet and Crown Window Glass**, consisting of the following sizes, viz: 10 x 8, 12 x 10, 14 x 10, 14 x 12, 16 x 12, 16 14, 18 x 12, 18 x 14, 20 x 14, 20 x 16, 24 x 18.


ALSO,

5 tons genuine white lead, in 1 cwt., ½ ditto, and ¼ ditto kegs
 100 tins boiled and raw linseed oil
 100 tins turpentine, 5 gallons each
 100 kegs green paint, 28lbs each
 20 casks plaster of Paris, 3 cwt. each

ALSO,

A large and varied assortment of dry colours, varnishes, brushes, &c. &c., of every description, which he is determined to sell at the lowest possible prices for cash only.

JOHN THOMSON,
 Wholesale and Retail Oil and Colourman, No. 362 George-street, opposite the Market.

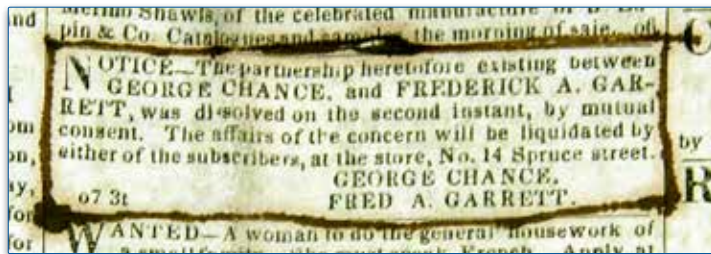
 No connexion whatever with any other house in the trade.

WILLIAM & GEORGE CHANCE

The USA window glassmaking trade was in its infancy in around 1810 with little competition for imported goods from Britain. The first agency established was by George Chance, Lucas and William's younger brother (see p.53).

George resided in New York from 1816 until 1837, during which time goods from Chance & Homer (William Chance & Son after 1825) in England, were exported to the US company of William (V) & George Chance: this provides a narrow timeline for those goods marked with the partner's names, "W & G Chance" for example.

After George returned to England in 1837, he was replaced by William's (V) son, also William (VI), and the US importer was renamed W Chance, Son & Co., while the goods were invariably marked "W. Chance & Son".



An advert showing George Chance terminating a partnership with Frederick A. Garrett, 'by mutual consent'

George then appears to have branched out on his own, selling Window & Picture Glass at 14 Spence Street

Both courtesy Sandwell Archives, undated



Flintlocks from the Iron Factors over the years

All engraved as follows, from the top:

Chance & Homer, late-18th century

Wm. Chance, early 19th century

W & G Chance, 1815–1835

W. Chance & Son, c.1830



The Company originally purchased the sodium sulphate it required, although because the yields were very low – only 10cwt (half a ton) of white ash from a ton of sulphate – two established chemical manufacturers, Adkins & Co. and Clay & Muspratt, were consulted to improve the supply of the product.

From April 1834, the Company decided to independently manufacture chemicals and the “Acid Works”, as it was commonly referred to, was established adjacent to No 2 Furnace. By the end of 1834, William Neale Clay was hired as the Manager (presumably linked to Clay & Muspratt) and he estimated that from six tons of sulphur and 11 cwt. 3 lb (560 kg) of nitre for the vitriol chamber yielded the following:

- 16 tons of acid of 1.75 (concentrate?)
- 17 tons of sulphate of soda of 98%
- 12 tons of white ash of 45%

His ideas spread further as it was possible to recover lime and sulphur from the vat waste, although a workable solution for this wastage was not found until some 50 years later.¹⁹⁵

With the primary purpose of the Alkali Works to manufacture salt cake (sodium sulphate) and, following the employment of an analytical chemist by the name of Richard Phillips, formerly a lecturer at St Thomas’ Hospital in London, this problem appeared to have been solved, although this later proved to be a false dawn (see p.83).¹⁹⁶

Two other chemists were contracted, Leonard and Robert Potts, who took over the manufacture of chemicals with excellent results. In June 1834 these efforts were resolved with patent No 6,846.¹⁹⁷

MURIATIC ACID NUISANCE

From as early as 1836, complaints were received from residents in the locality about the damage that the waste products, in particular muriatic acid (hydrochloric acid), caused to the surrounding area.

Clay was charged with finding a solution and contrived a method whereby an underground flue with suitable packing condensed the acidic fumes into a liquid. This was patented No 7,196 in 1836.

While this succeeded, it did not address the problem of what to do with the condensed acid. The Firm proposed to set up a plant that could manufacture a bleaching powder from the by-product, but even though plans were drawn up it was not taken further. A chimney 160 ft. (49 m) tall was constructed at this time to dispel the fumes.

Once the Alkali Works moved to Oldbury, the problem was simply transplanted and increased with its growth: complaints increased, and the residents eventually mobilised in opposition to the Alkali Works (see Volume 2, Alkali Works).¹⁹⁸

LEBLANC PROCESS

The Leblanc process industrialising the production of converting salt (NaCl) into sodium carbonate (Na_2CO_3 ; see p.42) and this became the industry standard until 1863, when the Solvay process rendered it redundant.

Its inventor, Nicolas Leblanc (1742–1806), embarked on the invention following the announcement of a prize of 2,400 livres (the archaic French currency equivalent to £92 [£11,127]) to be given by the Paris Académie Royale des Sciences to the first person who could successfully produce soda on an industrial scale. The reason for this prize was to prevent further deforestation of the French countryside to meet the public’s insatiable need for glass, soap and paper that all required soda ash for production.

Having a rich sponsor in the form of Louis Philippe II, duc d’Orléans certainly helped Leblanc in his ambitions, although this later rebounded heavily on both men.

The process not only benefitted the glass industry, but also soap and paper manufacturers. From the early 19th century, and once the Leblanc process had become commercialised, the use of kelp and particularly the burning of tress, became redundant.

Unfortunately, once Leblanc announced his process to claim the prize in 1789, the Paris Académie was not so forthcoming due to the outbreak of the first French Revolution (1789–1799), possibly protecting itself from showing favour to Louis Philippe II, who was executed in 1793.

This unfortunate saga ended with Leblanc committing suicide, after fifteen futile years trying to claim his dues.

NEW PREMISES

The chemical processes that were developed at Spon Lane swiftly outgrew the original premises. Separating the manufacturing resources of glass and alkali into two areas made sense. From 1835 the alkali plant was relocated to Oldbury, in an area covering $8\frac{3}{4}$ acres between Park House Lane and the Houghton arm of the Birmingham Canal. The lease, from the trustees of the deceased John Houghton, ran for 99 years and cost £100 [£10,513] per annum, although redemption allowing the Company to purchase the land was exercised in 1841 for the sum of £2,050 [£175,976]. William Clay was given £45 [£4,730] a year to enable him to secure a house in the locality.¹⁹⁹

The Hartleys, however, wanted no part of the Alkali Works, or with it being associated with the glassworks and on 18th April 1836, Lucas and William took over their interests and paid into the glassworks' accounts the amount already expended.²⁰⁰ The Hartleys probably saw the Alkali Works as an unnecessary distraction when the raw materials could be bought in, but although it took many years before the Alkali Works started to redeem itself, its value to the glassworks was unquestionable.

The first task on agreeing terms for the land was to erect a new plant to enable the Phillips process to be carried out on a large scale. Clay submitted two estimates for the new plant of £4,340 [£456,274] producing 48 tons of saltcake and 34 tons of white ash weekly, or £6,430 [£676,000] if double that quantity was required. For the lower yield, then eight saltcake furnaces, six black ash furnaces, an entire acre just for a pyrites bed and a wharf from the canal measuring 50 yds. (46 m) long was required.

The plans, though, were considered far too ambitious and this was scaled down considerably to:

... two saltcake furnaces, a pyrites bed of a quarter the size projected, a cistern and a receiver, a leaden cistern or boiler for evaporating, a chimney costing £50 instead of £700, and a shed; the whole at an estimated cost of £490 [£46,311].

When the work was nearing completion, it was agreed with Clay to construct a cottage and counting house as 'trespassers are already troublesome, and some person should be constantly in the immediate vicinity'.²⁰¹

The rotating furnace was key to the Leblanc process

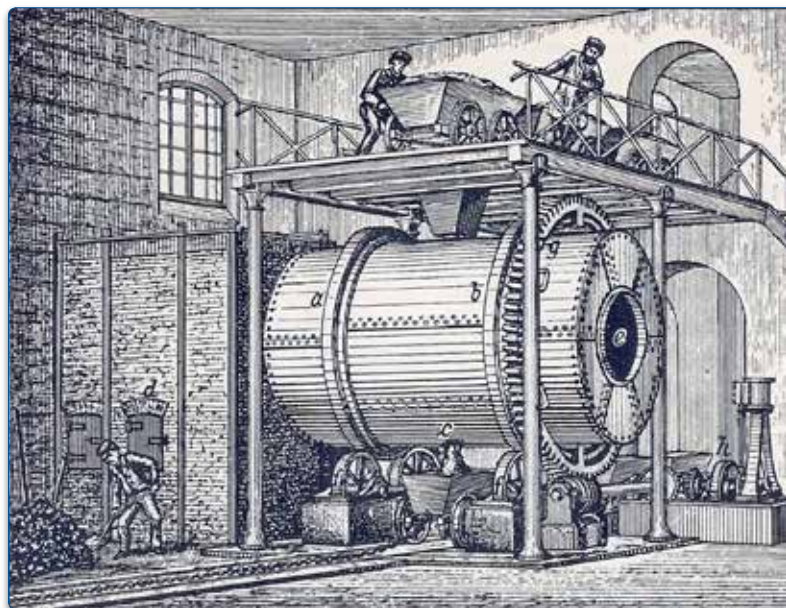
FAILURE AND EXPANSION

Although the Phillips process was unsuccessful, in February 1837 a vitriol chamber was built, some 55 ft. long, 17 ft. wide and 12 ft. high (16.8×5.2×3.7 m) at an estimated cost of £560 [£51,879], producing seven tons of salt cake weekly. More buildings were ordered, along with 'six low chimneys and flues, two "barilla" and three other furnaces'. Barilla is a plant that grows extensively on the western Mediterranean shores. By burning barilla, a soda is created, much like the use of kelp in Britain. With an influx of new workers expected, Clay was instructed to search for land suitable for housing.²⁰²

Over the next three years, a crystallising house was constructed at 'the north end of the present erection' and new plant was installed: a steam engine with boiler, two cranes, lime kiln, and a vitriol chamber about 12 ft. (3.66 m) square for experimentation, two further salt cake furnaces, a white ash furnace and chimney, another barilla furnace, a furnace for rouge and a cooperage (for barrel making).

At this time an order was made for five tons of Glauber's salts; developed by the German alchemist, Johan Rudolf Glauber, who discovered an artificial means to create a decahydrate of sodium sulphate (Na_2SO_4). This was an alternative to using soda, and being non-plant-based kept the glass clearer. Another use for Glauber's salts was as a laxative: it was named *sal mirabilis* (miraculous salt),²⁰³ but it is assumed the Works at this time was, like a laxative, "running smoothly".

As the years went by the number of products increased, sometimes due to by-products of another chemical process. More chemists were employed, and the factory was expanded to include these new processes.



Chances & Hartleys, 1834–1836

The elder John Hartley passed away in December 1833. While this was a severe loss to the Company, in a letter written to his brother Henry in December 1833, Lucas wrote:²⁰⁴

I don't know that his death will occasion any unfavourable change in my prospects, especially as the manufactory is in a very efficient state, as compared with any former period

John Hartley Snr. was on the verge of becoming a partner as William Chance wrote: 'Mr Hartley having died before a Partnership could be legally formed'.²⁰⁵ Following his death, Hartley's two sons, James (1811–1886) and John (1813–1884), were taken into the partnership in 1834, and the Company adopted the name of Chances and Hartleys.

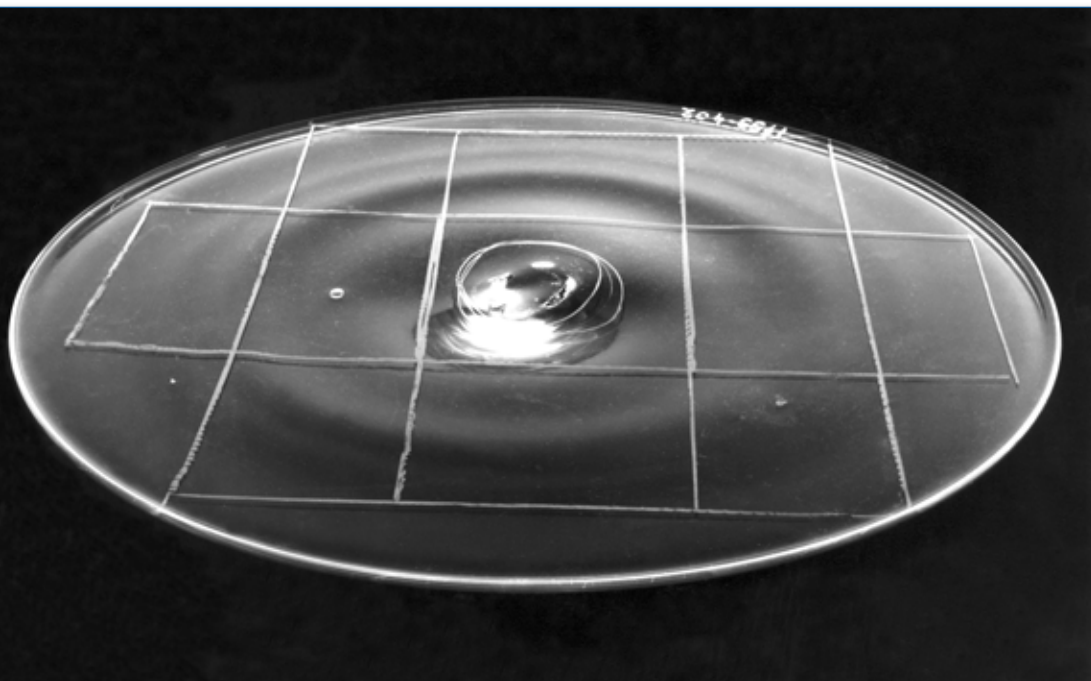
The new company started promisingly. John Hartley Jnr. took special charge of the crown houses and in 1834 he invented the "bullion cup", a patent being taken out on 22nd October 1834, which made a significant difference in the way the crown was made. A bullion is a small lump of molten glass that is attached to the bullion point of the glass crown, allowing the "nose" (where the punty is cracked off the disc) to be enlarged into the crown. Hartley's innovation reduced the size of the bullion point, creating a larger surface area of usable window glass.

The final central pane of glass (the "bullseye") was smaller and more refined making it more suitable for decorative purposes, or windows having a lesser criterion. With the gradual demise of crown glass, a few companies still took out a license to use the bullion cup, which earned Chances & Hartleys £75 [£8,066] by July 1834.²⁰⁶

The speed of the Company's growth under Lucas's management is demonstrated by the fact that after 1832 it paid more excise duty than all the other Birmingham glass-making firms combined. The excise levied on the weight of the glass added over 200% to the cost of manufacture. The aggregate figures of duty paid by the Company for the period 1834–1838 show the cost of manufacture for respective glass types.

Type	Manufactured Cost	Excise Duty
Sheet	£58,326	£133,422 10s
Crown	£180,335	£457,224 12s
Total	£238,661	£590,647 2s

As a guide, the costs of £238,661 [£21.89mn] and total excise duty of £590,647 2s [£54.2mn] show what a substantial sum this was for government coffers from a single manufacturer in only its second decade.



A small crown disc with a large bullion. The waste of glass is very apparent

© Science & Society Picture Library

DETERIORATION OF THE PARTNERSHIP

It was not long before the partnership with the Hartley brothers – both being young and in their early to mid-twenties – started to sour. Lucas, in his fifties, was not afraid to take a risk, but this was offset by James Hartley's conservative approach and his rather obdurate approach to glassmaking, in preferring his father's method over sheet glass. The first difficulties between the Chance and Hartley factions revolved around discussions about a new kiln invented by François Houtard of Mariemont (see pp.67–69), which was a new method of flattening sheet glass: Lucas was keen to try it but James Hartley opposed it.

Lucas's enterprising nature was contrary to James Hartley's conservative, no-risk philosophy. Hartley's opinion on sheet glass was 'we are never likely to get a much larger proportion of good glass than we have hitherto done.' While the earlier trials of sheet glass had not generated the best glass possible, James Hartley's lack of vision failed to accept that with continual improvement, the advantages of sheet far outweighed the quality of crown.

It is ironic that only a few years after the split, the new company formed by Hartley Brothers was making sheet glass itself.

Hartley also failed to accept that clay rings in the pots helped produce a greatly improved metal. His intransigence towards the Houtard kiln did nothing to endear himself to Lucas and William either. For the free-thinking Lucas Chance all this opposition must have proved seriously frustrating and inhibiting:²⁰⁷

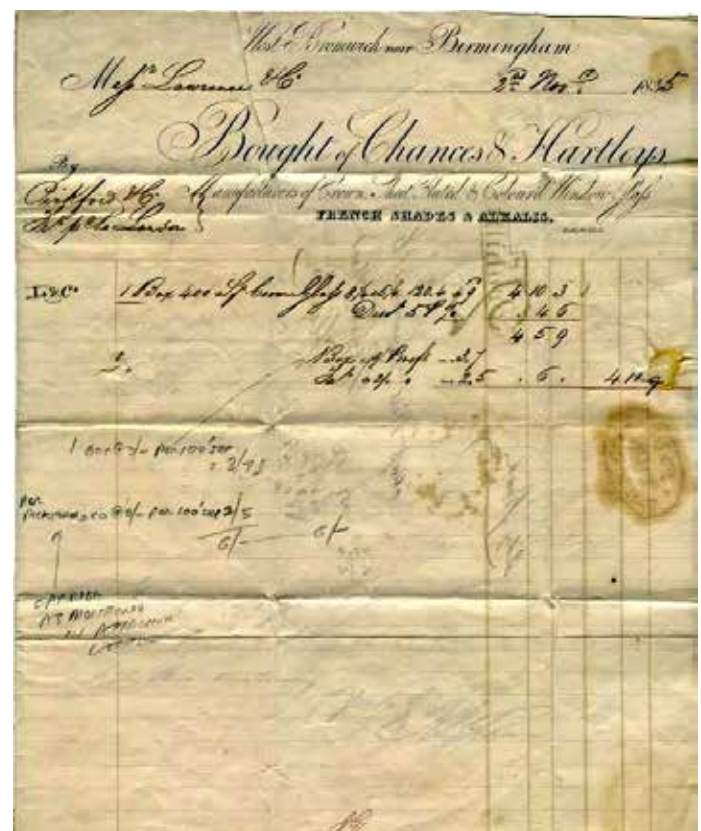
... any plan which would habitually secure good work and well annealed glass would also secure an unprecedented demand, and, if combined with good metal, would render us in the glass manufacture what Wedgwood was in that of earthenware

These hindrances aside, continual problems with the manufacture of crown glass occurred under the stewardship of two cousins of the Hartleys, also called James and John. In comparison, the work under the control of a foreman named Stamp was much better. Eventually, after many cautions and reprimands, Hartley's two cousins were dismissed, but instances such as this merely compounded the resolution for the two parties to go their separate ways. Lucas stated that the great redeeming feature of the Company's crown glass was the small bullion and a glass that was free of 'the wave', meaning the ripples that radiate from the centre, much like that created by a drop breaking the surface of still water.²⁰⁸



Where absolute clarity was not required, then panes with the large bullseye were a cheap option. These bullions indicate a pre-1834 date

A bill from Chances & Hartleys dated 2nd November 1835. The 400 panes of crown glass measuring 8¼x5¼-in. at £4 10s 3d, [£452] meant each pane cost 2.7d [£1.13] each





James Hartley, the main protagonist
behind the break up of the Partnership

Unfortunately, fresh recriminations followed. James Hartley 'frequently asserted that most of the difficulties he had to encounter, had their origin in the interference of RLC with his duties', as written by William Chance in an arbitration statement.²⁰⁹

The arguments caused an open breach. James Hartley petulantly refused to attend a board meeting and it was noted that he had, 'greatly lessened the profits of the concern by the negligent manner in which he conducted his department'. Lucas resolved that Hartley should only be responsible for No 1 Furnace.

The dispute appeared to centre on the credit for the working arrangements at No 4 Furnace, which was in service from 1834. At the next board meeting, Hartley reversed his former stance and approved a new resolution, claiming that Lucas should consider himself 'to have been very lightly treated', leaving Lucas to muse that it had never entered his mind 'that Mr Hartley would claim to be the author of that resolution'.²¹⁰

Although a meeting on 2nd September 1835 concluded that, 'all past differences were entirely and satisfactorily arranged', poor work and subsequent complaints from customers continued. Hartley failed to appear at another board meeting in March 1836 and the 16th July appears to be the last time he attended one.

The opening paragraphs of John Hartley's letter to William Chance, proposing a Joint Stock Company
Courtesy SA

A letter written by James Hartley to William Chance on 18th April 1836 showed that the cracks had widened. Hartley now suggested that a new Joint Stock company could be formed to replace Chances & Hartleys, and where shareholders and investors participated.²¹¹

The more I consider the matter the more I feel satisfied that the only route of getting rid of these difficulties arising from the differences of Mr. A L Chance [sic] and myself is by forming a Joint Stock Company.

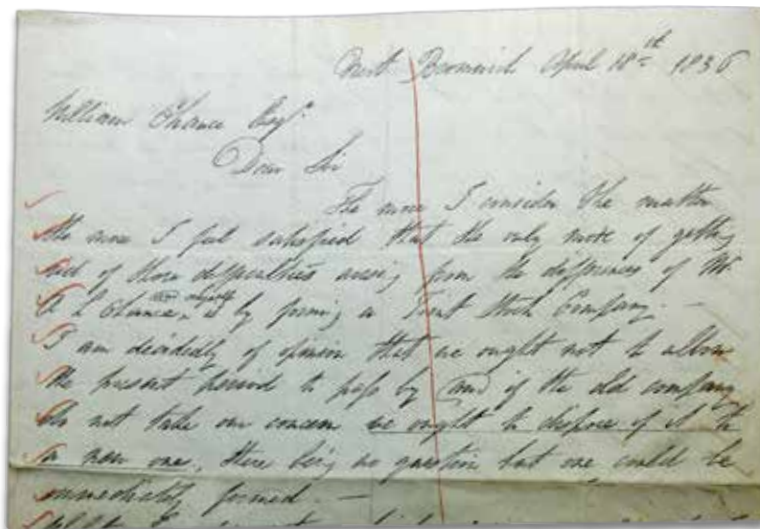
I am decidedly of opinion that we ought not to allow the present period to pass by and if the old company do not take our concern we ought to dispose of it to a new one, there being no question that one could be immediately formed.

The writing, though difficult to decipher, seems to deliberately refer to Lucas as "Mr A. L. Chance" for some reason, perhaps as a slight. But the underlined portion of the text infers that the demanding Hartley had already considered the possibility of starting a new company, with or without the Chance brothers.

The holdings in the Company at this time were weighted heavily in favour of Lucas and William so Hartley probably sought equity in the new company.

However, on 18th November 1836, the partnership was formally dissolved, and the Hartley brothers departed to set up their works at Sunderland. This town was probably chosen so that the brothers could be closer to Margaret, their married sister, although it was a condition of the separation that the Hartleys did not set up business within a certain distance of Smethwick. In a letter from James Chance to Lucas in 1846, it is mentioned that '... as in Hartley's case, would not be allowed to be within a given distance of our glass works'.²¹²

On 28th December 1836, it was reported (right) that the partnership was dissolved, 'by mutual consent'.^{212a}



An account appears to apportion the cash and assets in the glassworks as follows:

	Amount (£)	Share
William Chance	14,693 19s 0d	40.9%
R. L. Chance	5,921 18s 8d	16.6%
Mrs Hartley and family	13,174 13s 4d	36.8%
James Hartley	1,538 8s 10d	4.3%
TOTAL	£35,898 19s 10d [£3.39 mn]	98.6%

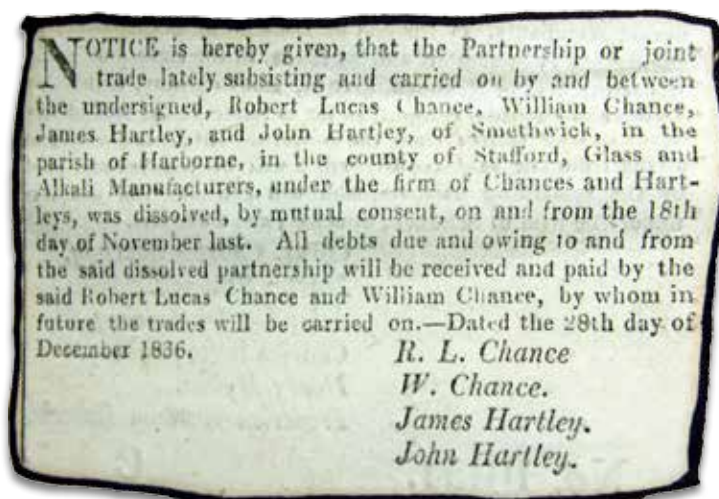
A further claim by Lucas for £520 (1.4%) was disputed by James Hartley, so the total available cash is given as £35,848 19s 10d [£3.39 mn].²¹³

After everything was taken into account, the share of each individual in Chances & Hartleys was divided as follows:

	Nº	%	Value [£]
William Chance	15	25.0	29,197 14s 6d
Lucas Chance	25	41.7	47,639 5s 6d
James Hartley	12½	20.8	23,928 9s 2d
John Hartley	7½	12.5	14,234 10s 10d
TOTAL			£115,000 [£10.87 mn]

With capital of £38,163 [£3.6 mn] in their pockets, the Hartley brothers were able to found their own company, the Wear Glass Works, in Sunderland.

The notice in the papers of the dissolution of the partnership
Courtesy SA

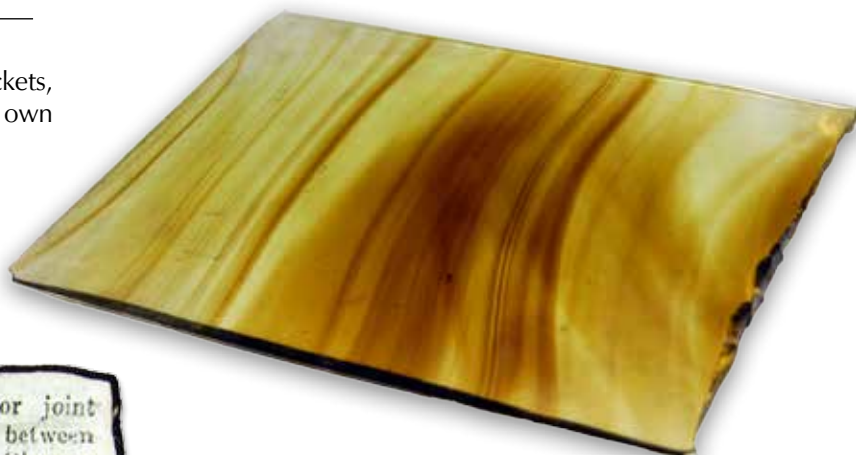


COLOURED & ORNAMENTAL GLASS, 1834–1839

Early colours appear to have been limited to green pot-metal as, on 26th March 1834, James Hartley was instructed 'to make a pot of green glass immediately', although its use is not apparent. The first mention of 'special stained' glass appears in a Board minute, dated 25th July 1834, where it was noted that before the next pot change, a journey using 'old frit materials and dark cullet' would occur.²¹⁴

Within a few months, on 6th February 1835, recipes for coloured glass were purchased for £5 5s [£577], supposedly from a Prussian manufacturer, and in November 1835 new flint glass pots were ordered at the end of each furnace for making the glass. The first colours produced were red, orange, yellow and 'lemon' (presumably a light yellow), although production was limited to between 20 and 40 sheets per week.²¹⁵

In June 1838, a 'muffled kiln' was ordered to make decorative glass and the following year the staining room was enlarged. Muffled glass was a German development that followed similar lines to making sheet glass, except that the glass was blown into a mould to create cylinders of glass.²¹⁶ Thereafter splitting and flattening procedures were applied. Adding a light texture to the mould meant that the outside of the finished cylinder retained this impressed textured finish.



A sample of muffled glass made by Chance Brothers. The swirls of colour were created by trailing molten glass of a different colour onto the partially formed glass, prior to being blown into the mould
Courtesy SA

BIRMINGHAM PLATE GLASS CO.

During the period before the Chances and Hartleys split, it was suggested that a merger between Chances & Hartleys and Birmingham Plate Glass Co., could be formed with capital of £500,000 [£47.26mn]. The full exhaustive title of the new company was "The Birmingham Plate Glass, Crown Glass, German Sheet Glass, French Shade, and Alkali Co." to ensure that every base was covered. The name was a little misleading as Birmingham Plate Glass was located on Bridge Street, Smethwick, and close neighbours to Chances & Hartleys. Like the Spon Lane site, the plant was situated between the two Birmingham canals, upper and lower levels.

William Chance was proposed as a director, with Lucas and James & John Hartley being managing partners. Claims of '*unusually large profits*' had already been made and expectations of not less than a 7½% annual return over the first five years seemed to rely on the abolition of the Excise Duty.²¹⁷

A document produced before the ending of the Chance & Hartley partnership describes the working premises and gives an insight into Chance Brother's assets:²¹⁸

The Premises consists of a large mansion and pleasure grounds, a House for an under Manager, about 40 cottages for the Workmen. One single and two double crown Houses capable of working from ten to twelve thousand tables per week. One House for working German sheet glass and shades. Lead chambers, and alkali works in which about 25 tons of soda can be made per week. Carpenter's shop, a smith's shop on an extensive scale. Engines for grinding materials, &c. Gas apparatus, Warehouses, cutting rooms, pot-rooms &c., upon a very extensive scale. The Premises occupy 12 or 14 acres of ground, which is freehold and is bounded and intersected by the Birmingham Canal, both on the upper and lower level.*

*It is worth noting that Lucas estimated eighteen acres for the entire Spon Lane site.²¹⁹

Additionally, the further overseas assets of the Company were collated:

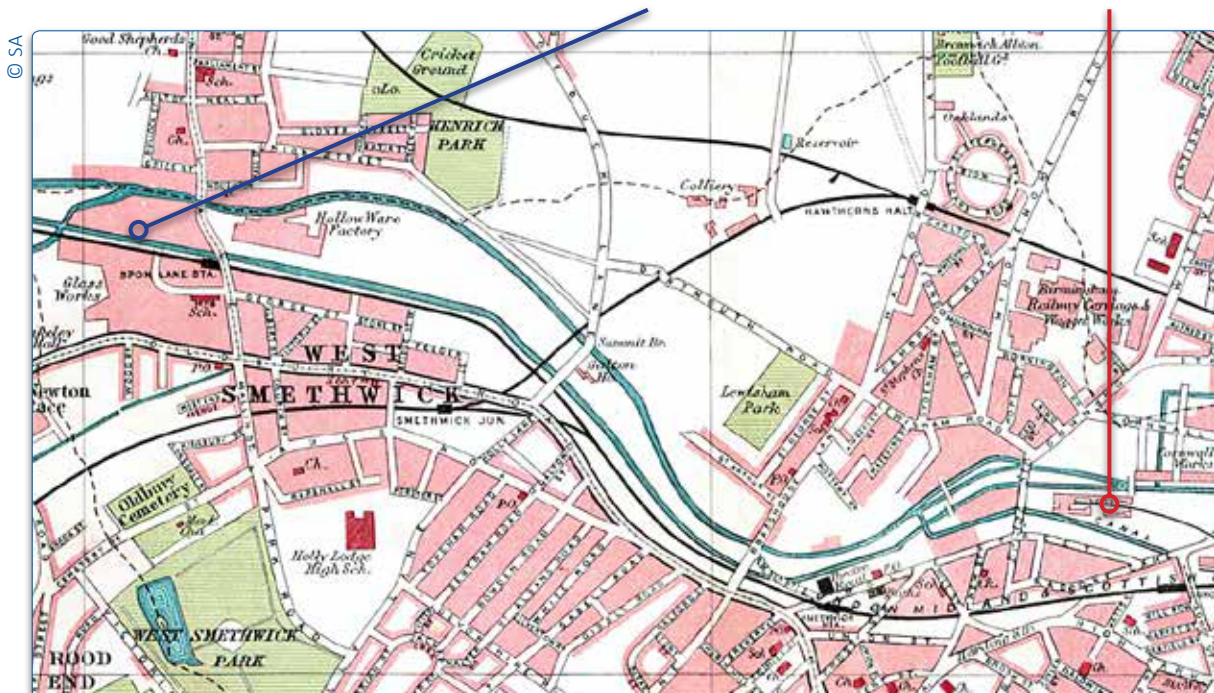
Independently of their country trade, they have an establishment at New York; established agencies in Canada, New South Wales, Van Diemen's Land, East Indies &c., &c.; and the quality of their manufacture is known throughout the world

The advances that Chances & Hartleys had already made in the ten years of operation were also put forward against the proposal, namely:

- Seventeen acres of freehold land
- An alkali works producing twenty tons of soda per week
- A sixth of all British window glass coming from Spon Lane
- Growth on a year-by-year basis

According to William Chance in a rough draft, the last point also concerned the intangible factor of management. Without the guidance of Managers the work suffered, and to succeed then the same personnel needed to be employed with matching salaries.²²⁰

Respective locations of the two rival companies
Chance Brothers Birmingham Plate Glass Co.



The rough notes sketched out by Lucas showed the expectations of the Company, should such a merger be agreed upon. The amount of capital invested was ‘not less than £150,000 nor more than £210,000’ [£14.18mn–£19.85mn] and it was clear that Chances & Hartleys should ‘keep half the concern’. Instead of salaries, the principals would receive a percentage of profits, but 4,000 shares should be added with friends and relations being invited to invest.

It appears that, even in 1836 when the disputes with the Hartley brothers were at their height, Lucas showed empathy towards the younger brother, John, ‘whose health was indifferent’. His work on the bullion cup invention had proved its worth and Lucas required that Birmingham Plate gave shares to ‘satisfy him [John] in case of his services being required’.

Other demands were that John Hartley be appointed sub-manager at a salary of £300 [£28,354] per annum; two of Lucas’s sons and ‘one or two’ of William’s be taken into the business as required, with the expectation that they took up managerial posts.²²¹

Given the overwhelming demands, the Birmingham Plate pulled out of further negotiations: ‘That new extended propositions of Messrs. Chance & Co. are inadmissible, and are consequently declined’. Only ten years later in 1846, Lucas attempted an outright purchase of Birmingham Plate from the Gibbins brothers but once again it came to naught.²²²

NAILSEA SALE

In April 1836, Nailsea Glassworks was advertised for sale – one of the few times this occurred over the next 34 years. The complete works and machinery were listed for sale or lease: everything the budding entrepreneur needed.²²³ The enterprise appeared profitable, according to the notebooks of Charles Thornton Couthupe (d.1857), a son of the original partner, who appeared to have a good grounding in glassmaking and a chemistry education. It is estimated that 120 people were employed and about 1.5m sq. ft. of crown glass was being shipped to the firm’s warehouse in Nicholas Street.²²⁴ Just over a year later, an advert was placed by Lucas, Couthupes, and Co. that once again requested people not to use their carter for transporting parcels or packages, so the takeover does not appear to have been concluded.²²⁵

WHO WAS LUCAS CHANCE?

Lucas Chance was extremely hard-working and highly focused, restless, inquisitive and at times a risk-taker. He was demanding, yet he had a compassionate and philanthropic side. In his private diary, William wrote of his brother as being a:

... devourer of books and would read them at meals and while driving to the works and back. Lucas would take his meals walking up and down for exercise and while talking to anyone would sometimes eat a piece of bread to save time.

This impatience and tirelessness impacted Lucas’s health, with him suffering from dyspepsia that he attributed to losing all his teeth later in life.²²⁶

For recreation, Lucas appears to have turned to horticulture, and with Mr W. Lewis, his gardener, won first prizes at the Birmingham Botanical & Horticultural Society in 1838. One was for a dish of fine peas that were “forced” to encourage early growth ‘a novelty seldom seen so early even in milder seasons’. Another “first” was for hardy annuals, alongside three other lesser awards.²²⁷

His single-minded attitude was, at times, probably very hard for the other partners to live with and there were many times when he was very impulsive, as revealed by his problems with Badams and Bessemer.

His man-management skills could also leave something to be desired and occasionally caused problems in the workplace. The continual need to cut costs, while increasing efficiency and production is, of course, natural to any manufacturer, but in Lucas’s case, this eagerness was promoted to a new level. The 39-point instructions on managing the staff (see Appendix 1) that was issued as a memo to his son, John Homer Chance on his joining the Company in 1850, typified Lucas’s need to ensure his wishes were carried out.

Was Lucas’s personality a positive advantage to the Company? Given the vast amount of money that he wasted on such failed enterprises, it would be simple to conclude that it was not. But this is taking just two examples amongst the numerous successes that resulted from his inspirational forward-thinking, such as the introduction of sheet glass, experimentation with new processes and continually pushing the boundaries of what was possible.

NAILSEA GLASS WORKS.

27th January, 1827.

LUCAS, COATHUPE, and Co. earnestly request, that the Shopkeepers and others, resident at Ashton and Nailsea, will not send Goods or Parcels by their Carts, the drivers having particular orders not to take them.

1827: An echo from previous attempts to prevent villagers from taking advantage of Nailsea’s carriers
Courtesy of BL



Section 2: Endnotes

- 1 SamuelJohnson.com
- 2 JFC, p.1
- 3 R. L. Chance, private account book, 1821–1831; transcribed by Sir Hugh Chance
- 4 Ibid
- 5 Ibid
- 6 Ibid
- 7 www.edpopehistory.co.uk, Crabb Robinson Diary.
- 8 R. L. Chance, private account book, 1821–1831; transcribed by Sir Hugh Chance
- 9 Ibid
- 10 Ibid
- 11 Birmingham and the Midland Hardware District: On the Manufacture of Plate, Crown, and Sheet Glass, pp.147–152, Henry Chance, Ed. Samuel Timmins, 1866
- 12 Ibid
- 13 Old Glass: European and American, p.253, N. Hudson Moore, 1924, Tudor Publishing Co.
- 14 JFC, p.9
- 15 Wikipedia
- 16 The Hull Packet and Humber Mercury, 11th October 1831
- 17 Memories of Ray Drury
- 18 RoyalSociety.org
- 19 Powell, Harry J.; Chance, Henry; Harris, H. G., The Principles of Glassmaking, 1883
- 20 R. L. Chance, private account book, 1821–1831; transcribed by Sir Hugh Chance
- 20a Birmingham Journal, 16th July 1825
- 20b Saint James's Chronicle, 15th July 1828
- 21 JFC, p.106
- 22 British-history.ac.uk
- 23 Glassmakers of Stourbridge and Dudley 1612–2002, Jason Ellis, 2002, Xlibris Corp.
- 24 13th May 1836, London and Birmingham Canal
- 25 Aris's Birmingham Gazette, 14th March 1825
- 26 Ibid, 3rd May 1830
- 27 Freeling's Railway Companions: Liverpool, Manchester, and Birmingham Guide, Arthur Freeling, 1836, Whittaker & Co.
- 28 R. L. Chance, private account book, 1821–1831; transcribed by Sir Hugh Chance
- 29 Freeling's Railway Companions: Liverpool, Manchester, and Birmingham Guide, Arthur Freeling, 1836, Whittaker & Co.
- 30 Aris's Birmingham Gazette, 10th January 1825
- 31 Worcester Journal, 27th January 1825
- 32 timetableworld.com
- 33 JFC, p.19
- 34 Ibid, p.19
- 35 London Gazette, 29th May 1827
- 36 Nailsea, p.10, Margaret Thomas, 1987
- 37 The Nailsea Glassworks, p.10
- 38 JFC, p.3
- 39 Ibid, p.xx
- 40 R. L. Chance, private account book, 1821–1831; transcribed by Sir Hugh Chance
- 41 Bristol Mirror, 30 May 1829
- 42 The Curious History of the Bulb Vase, Patricia Coccoris, 2012, Cortex Design
- 43 Bontemps on Glassmaking, translated by Michael Cable, 2008, Society of Glass Technology
- 44 JFC, p.189
- 45 Bontemps Biography, Michael Cable, personal file
- 45a SA, BS6 3/3/3/1
- 46 Birmingham Chronicle, 13th July 1826
- 47 Ibid
- 48 Showell's Dictionary of Birmingham, 1888
- 49 History Gazetteer & Directory of Staffordshire, 1834
- 50 History of Staffordshire, 1811
- 51 History Gazetteer & Directory of Staffordshire, 1834
- 52 History of Staffordshire, 1811
- 53 Worcester Journal, 24th August 1820
- 54 Aris's Birmingham Gazette, 23rd June 1828
- 55 History, Topography and Directory of Warwickshire, 1830
- 56 London Gazette
- 57 Morning Chronicle, 3rd November 1823
- 58 Aris's Birmingham Gazette, 21st April 1828
- 59 Ibid, 21st April 1828
- 60 Ibid
- 61 Ibid, 18th August 1828
- 62 Ibid, 10th January 1848
- 63 JFC, p.3
- 64 Leeds Intelligencer, 14th April 1831
- 65 The Morning Chronicle, 19th April 1831
- 66 Ibid
- 67 CSC, MS67/3/2
- 68 The History of Chance Brothers, J F Chance, 1923
- 69 <http://carlyleletters.dukejournals.org/>
- 70 The Morning Chronicle, 23rd August 1816
- 70a Aris's Birmingham Gazette, 1st September 1823; Evening Mail, 11th September 1822
- 71 The Carlyle Encyclopaedia, p.334
- 72 JFC, p.3
- 73 Birmingham Chronicle, 8th February 1827
- 74 Birmingham Journal, 18th August 1827
- 74a VictorianWeb.org
- 75 The Morning Post, 5th January 1829
- 76 Aris's Birmingham Gazette, 15th February 1830
- 77 Bury & Norwich Post, 16th July 1828
- 78 From Georgian Traders to Victorian Manufacturers, Robert Johnstone, 2016, M.Sc Thesis
- 79 The Bank of England and the Country Banks: Birmingham, 1827–1833, p.550, David J Moss (from The Economic Review, 2nd Series, Vol. XXXIV, No4, 1981)
- 80 Aris's Birmingham Gazette, 30th May 1831
- 81 Ibid, 1st February 1832
- 82 London Gazette, January 1834
- 83 Ibid, 18th November 1833
- 84 Directory of Birmingham, 1835
- 85 Kensington Palace, 5th July 1837
- 86 JFC, p.xx
- 87 Ibid
- 88 Lecture by Prof. Carl Chinn
- 89 Birmingham Journal, 31st October 1829
- 90 JFC, p.3, fn.4
- 91 Birmingham Journal, 28th June 1828
- 92 Aris's Birmingham Gazette, 20th September 1824
- 93 Ibid, 2nd February 1824
- 94 Ibid, 22nd October 1827
- 95 Ibid, 21st April 1828
- 96 Cambridge.org; the author's opinion
- 97 Aris's Birmingham Gazette, 24th November 1828
- 98 Birmingham Journal, 14th November 1829
- 99 The Times, 22nd & 23rd January 1824; ucl.ac.uk/bloomsbury-project/
- 100 Ibid, 31st March 1826
- 101 Birmingham Journal, 3rd October 1829
- 102 Ibid, 16th January 1930
- 103 Aris's Birmingham Gazette, 18th January 1830
- 104 Birmingham Journal, 3rd October 1829
- 105 Ibid, 31st October 1829
- 106 Birmingham Gazette, 20th January 1830
- 107 Ibid, 18th January 1830



- 108 Aris's Birmingham Gazette, 25th January 1830
- 109 Business-Live.co.uk; Chris Upton
- 110 Aris's Birmingham Gazette, 15th March 1830
- 111 Ibid, 1st March 1830
- 112 Birmingham Journal, Saturday 10th April 1830
- 113 London Courier and Evening Gazette, 29th April 1830
- 114 JFC, p.3, fn.4
- 115 Old & New Birmingham, 1880; Birmingham Journal, 27th September 1830; Wikipedia.org
- 116 Birmingham Journal, 27th September 1830
- 117 Ibid
- 118 ?Birmingham Argus, 27th September 1830
- 118a Britannica.com
- 119 Directory of Birmingham, 1835, Wrightson & Webb
- 120 ChartistCollins.com
- 121 JFC, pp.5–6
- 122 Ibid, p.4; fn.4
- 123 GracesGuide.co.uk
- 124 Calculations and Statements relative to the Trade between Great Britain and the United States of America, W. F. Reuss, 1833
- 124a The Glazing of the Crystal Palace; Paul Hollister; 1974; Journal of Glass Studies, Vol. 16, pp. 95–110
- 125 Sunderland Daily Echo and Shipping Gazette, 27th May 1886
- 126 The Crown glass cutter and glazier's manual, William Cooper, 1835, Simpkin, Marshall & Co. London
- 126a Gardner's Cabinet Cyclopaedia, p.17; George Richardson Porter; 1832; Longman, Rees, Orme, Brown, and Green
- 127 HistoricalStatistics.org
- 128 JFC, p.4
- 129 Ibid, p.6
- 130 BS6/10/1/1/1, The Career of a Simple Workman, G. André
- 131 JFC, p.7
- 132 Ibid, p.7
- 133 Ibid, p.7
- 134 Ibid, p.7, fn.2
- 135 Workmen and their Difficulties, Mary Bayly, 1861, Robert Carter & Brothers
- 136 TCB, p.64
- 137 Ibid, p.65
- 138 Ibid, pp.64–65
- 139 JFC, p.49?
- 140 Ibid, p.14, fn.3
- 141 Ibid, p.14
- 142 Ibid, p.49
- 143 Ibid, p.14, fn.5; p15, fn.3
- 144 Ibid, p.8
- 145 Ibid, p.8
- 146 The Principles of Glass-Making, Harry J. Powell, 1883, George Bell & Sons
- 147 JFC, p.9–10
- 148 Ibid, p.10
- 149 Ibid, p.10; Board Minutes, 22nd September 1833
- 150 JFC, p.10, fn.3
- 151 Ibid, p.10–11
- 152 Ibid, p.11
- 153 Ibid, p.11, fn.2
- 154 Ibid, p.11
- 155 Ibid, p.11, fn.3
- 156 Ibid, p.4, fn.3
- 157 Ibid, p.10–11
- 158 Ibid, p.12
- 159 Wikipedia.org
- 160 Aris's Birmingham Gazette. 14th March 1825
- 161 JFC, p.12–13; p.13, fn.1
- 162 Ibid, p.13
- 163 Ibid, p.13
- 164 Ibid, p.14, fn.1 & 2
- 165 Ibid, p.22
- 166 Shirley Hibberd, the father of amateur gardening, Anne Wilkinson, 2012, Cortex Design
- 167 JFC, p.19
- 168 British-History.ac.uk; An Act for granting to His Majesty severall Rates or Duties upon Houses for making good the Deficiency of the clipped Money. [Chapter XVIII. Rot. Parl. 7&8 Gul. III. p.5.n.4]
- 168a John Houghton, Coll. for Improvement of Trade and Commerce (1727), ii, 48
- 169 Thirteenth Report of the Commissioners of Inquiry, Vol. XXXI, 1835, p.59
- 170 Ibid, p.3
- 171 Ibid, p.9
- 171a A History of Glassmaking; Douglas R. J. & Frank, Susan; 1972; G.T. Foulis & Co. Ltd., 1972; p.
- 172 Ibid, p.9
- 173 JFC, p.6
- 174 Thirteenth Report of the Commissioners of Inquiry, Vol. XXXI, p.75, 1935
- 175 JFC, p.15
- 176 Ibid, p.16
- 177 Ibid, p.17
- 178 Ibid, p.18
- 179 Wikipedia.org
- 180 JFC, p.276
- 181 Ibid, (Walter Chance) p.276–277
- 182 Ibid, p.277
- 183 Ibid, 280
- 184 GracesGuide.co.uk
- 185 The Times, 3rd March 1829
- 186 JFC, p.281–282
- 187 Ibid, p.282
- 188 The Sydney Gazette and New South Wales Advertiser, 17th March to 2nd April 1829
- 189 New York Tribune, 12th February 1842
- 190 Port Philip Gazette, 14th October 1841
- 191 The Sydney Morning Herald, 4th March 1844
- 192 JFC, p.282
- 193 Early Australian Commercial Glass: Manufacturing Processes, Dr James Boow, 1990, The Heritage Council of NSW, p.102
- 194 Ibid, p.103
- 195 JFC, p.18
- 196 GracesGuide.co.uk; JFC, p.18, fn.2
- 197 JFC, p.18, fn.2
- 197a GracesGuide.co.uk
- 198 JFC, p.200
- 199 Ibid, p.198
- 200 Ibid, p.18–19
- 201 Ibid, p.198
- 202 Ibid, p.198–199
- 203 Hypotheses.org
- 204 JFC, p.12
- 205 CHAS, BS6/1/2/2
- 206 JFC, p.12
- 207 Ibid, p.20
- 208 Ibid, p.20
- 209 CHAS, BS6/1/2/2
- 210 JFC, p.20–21
- 211 CHAS, BS6/1/2/2
- 212 JFC, p.70
- 213 CHAS, BS6/1/2/2
- 214 CHAS, BS6/1/3/15–16
- 215 Ibid
- 216 JFC, p.187
- 217 Ibid, p.21–22
- 218 Ibid, p.22–23
- 219 Ibid, p.23–24
- 220 Ibid, p.23–24
- 221 Ibid, p.24–25
- 222 Ibid, p.22–23
- 223 Bristol Mercury, 23rd April 1836
- 224 Sir Hugh Chance article, PG>R, January 1958
- 225 Bristol Mercury, 13th May 1837
- 226 RevolutionaryPlayers.org.uk
- 227 Aris's Birmingham Gazette, 21st May 1838



Bibliography

In the writing of this book, I drew on a wide range of sources. The two most important were James Frederick Chance's *A History of the Firm of Chance Brothers & Co. Glass and Alkali Manufacturers* and Prof. T. C. Barker's *The Glassmakers*, the latter which, despite being the history of Pilkington Brothers, does reveal significant detail about the operation at Chance and the interaction between the two rivals.

Chance Reflections is not merely a rewrite of these two eminent works. J. F. Chance's work, at around 150,000 words, is large and to a certain extent had to be préciséd as much of the detail might be considered superfluous to the general readership.

The second phase of the work, following on from the end of J. F. Chance's book (1919, then a brief postscript to 1926) until the take-over by Pilkington (late-1952), had to be stitched together from a mass of sources, many being detailed in the following list, but mainly from the archives at Sandwell Library. Thankfully, the unpublished memoirs of Sir Hugh Chance, covering 1920 to 1975, filled in several gaps, and his personal recollections proved an invaluable insight into the relationships between the management and general workforce.

The greater amount of work went into the third phase: a compilation of the history from 1952 until 1981, which paradoxically required far greater research. While some might feel this is quite odd, much of the Company's archive was still in storage and to all accounts inaccessible, until 2010. To exacerbate this, the Board Minutes from 1949–1956 and 1968–1981 were missing and no-one at Pilkingtons, or its archivists, was able to confirm the whereabouts.

Prior to this, I personally made efforts to retrieve as much of the records that were stored in the former office block, adjacent to the seven-story building, a few days before it was due to be demolished. This mass of paper was discovered in heaps strewn across the floor after the filing cabinets had been emptied by workmen only too eager to clear the rooms, probably so that the cabinets could be sold on. While much of the paperwork was of a routine accounting and statistical nature, some more valuable material was saved. But not all ...

Some of the material for the latter phase was therefore gained from contemporary reports, such as those appearing in the in-house magazine, *Chance Comments*, newspaper reports and the reminiscences of former workers, like Tony Cartwright, Ray Drury, Howard Cosnett and Alan Taylor, proved invaluable.

JOURNALS, ARTICLES & MAGAZINES

Architect & Building News, The (various)
Birth of Birmingham's Glass Industry, The; D.N. Sandilands (M.Com. thesis, Univ. Birm.); 1927;
Society of Glass Technology, 1931, Vol. 15
Bradshaw's Railway Companion; 1840
Chance Comments; 1948–1963
Chemist & Druggist, The (various)
A. Claudet, F.R.S.: A Memoir; 1868; reprinted from *The Scientific Review*
Construction History; The use of scientific experimentation in developing the glazing for the Palm House at Kew; Vol. 26, pp.19–39; Henrik Schoenefeldt
Country Life; various
The Crystal Palace's glass: A technical and social history; Tom Chance; 2018
Cullet; 1959–1967; Pilkington Brothers
Dictionary of Birmingham; Showell
Directory of Birmingham; Wrightson
Engineer, The (various)
Flat Glass Manufacturing Processes; 2006; Prof. Michael Cable; The Newcomen Society
Flight; 1920–1954
Gas Journal (various)
Glass Age; 1969–1980
Georges Bontemps Biography; 2008; Prof. Michael Cable (unpublished personal file)
History and Heritage of the Optical Industry in Smethwick and Walsall, The; Victoria L. Brookes; Blackcountryman magazine
History WM, various
Journal of Glass Studies, Vol 16, pp.95–110; 1974;
Glazing of the Crystal Palace; Paul Hollister
Nature (various)
Official History of the Ministry of Munitions, The; 12 volumes in all; originally 1923, reprint 2008; HMSO
Post Office Electrical Engineers Journal, The (various)
Pottery Gazette & Glass Trade Review; 1935–1971
Pottery & Glass; 1952–1963
Punch (various)
Tableware International; 1963–1981
Two Centuries of Flat Glass Manufacture; Miss P. A. Pemberton; Vol. 13, No 2; 1975; British Society of Scientific Glassblowers (BSSG) Journal



Online Resources

All sites are preceded with 'www.', which most browsers do not require you to enter except those where the full URL (e.g. <http://>) is given.

Correct at going to press, but some websites have since closed down. These might be retrieved using Archive.org's "Wayback Machine". Those links where just a single mention is made can be seen in the endnotes.

THE ESSENTIAL ONES

Archive.org

British History Online: british-history.ac.uk

The British Newspaper Archive:

britishnewspaperarchive.co.uk

European Patent Office: epo.org

Flight Magazine: flightglobal.com

Grace's Guide: gracesguide.co.uk

Revolutionary Players: revolutionaryplayers.org.uk

Science Museum Group: <https://collection.sciencemuseumgroup.org.uk>

The Times Digital Archive: GaleGroup.com,
courtesy of Birmingham Libraries

Wikipedia.org (but always double-check the data)

OTHERS

academia.edu

<http://ads.ahds.ac.uk> – Archeological Service; Nailsea Glassworks;
aladdinlamps.info

archive.org – a resource for many magazines. The Wayback

Machine can also retrieve "retired" or obsolete websites

bairdtelevision.com – the early history of the company

bankofengland.co.uk – Bank of England inflation calculator

bcn-society.co.uk – Birmingham Canal Navigations Society

birmingham.ac.uk/facilities/cadbury/ - Cadbury Research Library

birmingham.gov.uk – Birmingham Libraries

blackcountryhistory.org – the hierarchy of the Chance Archives

blackcountryhistory.org

bohoglass.co.uk – Nailsea article

brightonfilm.com

british-history.ac.uk

britishnewspaperarchive.co.uk

britannica.com

bssg.co.uk - The British Society of Scientific Glassblowers

1cha.co.uk – Henry Chance's site on Sir

Hugh's World War I experiences

azelis.com – on the legacy of the Chance & Hunt chemical works

canalmaps.net

canalplan.org.uk – guide for any canal

canalrivertrust.org.uk

cartographics.co.uk

chanceglass.net

chanceglassware.uk

chance-hunt.com – the legacy of the Alkali Company

<https://chroniclingamerica.loc.gov> – online

US newspaper resource

cmog.org – Corning Museum of Glass

<http://collection.hht.net.au> – Caroline Simpson
Library; data on 1869 illustrated catalogue

convert-me.com – to convert weights, distances and areas

<https://discover.libraryhub.jisc.ac.uk/>

costofliving.uk – Inflation calculator, in £.s.d

craig-telescope.co.uk

crystalpalacemuseum.org.uk

digitalmidlands.org.uk

<https://dingler.bbaw.de> - German academic papers

english-heritage.org.uk

englishantiqueglass.co.uk – Manufacturers of original flat glass

epo.org – European Patents Office

espacenet.com – European Patents Office

flightglobal.com

freepatentsonline.com

forebears.io – Chance name (or any name) global distribution

thegazette.co.uk – Legal notices posted in

the Gazettes of Great Britain

glass-study.com – archive of glass-based topics

Google Sites

google.com/maps

google.com/translate

<https://books.google.co.uk>

<https://patents.google.com>

glassian.org

gracesguide.co.uk – everything on engineering and more

gutenberg.org – Project Gutenberg for historical books

handsworthhistory.co.uk

hathitrust.org – Resource for magazines

heritagegateway.org.uk – English historic sites & buildings

hetleys.co.uk – Agent for W E Chance and Chance Brothers

historicengland.org.uk – Resource for text and images

historicalstatistics.org: Historical currency conversion; others

historyofoldbury.co.uk – article on Blakeley Hall

historywm.com -- a resource for all West Midlands industry

hpcbristol.net – information on David Henderson Marr

imagesofengland.org.uk – English Heritage

ipo.gov.uk – Intellectual Property Office

jstor.org

kog.com – Traditionally made rolled and sheet glass

lamberts.de – Antique rolled glass

leadedstainedglass.com

Lighthouses

ChanceBrothers.com – Chance lighthouses live on!

ibiblio.org – Lighthouses of the Southern Netherlands

lighthousedigest.com – an amazing database of all lighthouses

lightkeepersjourney.com

lighthousememories.ca

<https://trinityhousehistory.wordpress.com>

uklighthouse.info – Alan Taylor's site

<https://uslhs.org/> - United States Lighthouse
Society; various articles

localhistory.scit.wlv.ac.uk/BCMC/phoenix/

phoenix01.htm – Phoenix glassware

londoncrownnglass.co.uk – examples of Muffled glass

madeinbirmingham.org

makingthemodernworld.org.uk – URL correct, but now archived
content under the auspices of the National Archives



<https://maps.nls.uk> – Library of Scotland (maps from c.1880)
mapseeker.co.uk
mddionline.com – plastic syringes
measuringworth.com – to calculate the relative worth of the British pound (£)
medium.com – information on the Festival Pattern Group
milweb.net – date on military vehicles, including a wartime airfield light
<https://sites.google.com/site/molwebbhistory>
 – The History of Molineaux & Webb
nationalarchives.gov.uk
naa.gov.au – National Archives of Australia
<https://nla.gov.au> – National Library of Australia
<https://newspapers.library.wales> – The National Library of Wales
newton-le-willows.com – Newton Crown glassworks
parliament.uk
OpenDomesday.org
<https://or3d.teampatform.com> – Survey of Chance Brothers land at Spon Lane
<https://paperspast.natlib.govt.nz> – Historical newspapers
pearsons-glass.co.uk – Suppliers of Antique and sheet glass
pierre-marteau.com – Historical French to British conversion
pubs-newcomen.com – The Newcomen Society
<https://regencyredingote.wordpress.com>
revolutionaryplayers.org.uk – Revolutionary Players: on Lucas Chance, William Chance and Chance Brothers
roysocietypublishing.org – on Sir William Crookes
sashwindowspecialist.com – a nirvana for rolled plate textures
scienceandmediamuseum.org.uk
scienceandsociety.co.uk
sgt.org – Society of Glass Technology
sil.si.edu – Scientific Identity (Smithsonian) Library
slavevoyages.org – to disprove any link of slavery to the Chance family
statistics.gov.uk
saint-gobain350years.com – Saint Gobain 350th Anniversary
saint-gobain-glass.com
sandwell.gov.uk/archives/
Toyo.Sasaki.co.jp – Toyo-Sasaki Glass
smethwick.org.uk
http://specialcollections.le.ac.uk – University of Leicester; Town and City directories
stainedglass.llgc.org.uk – Stained glass in Wales
sueyounghistories.com – Birmingham Homeopathic Hospital and Dispensary
terrmedia.co.uk – Television receivers
terrypepper.com – Lighthouses of the western Great Lakes; Fresnel lens
thepeerage.com
timetableworld.com – Early railway timetables
trinityhouse.co.uk – Lighthouses authority
trinityhousehistory.wordpress.com
uklighthouse.info
<https://uslhs.org> – United States Lighthouse Society
vads.ac.uk – Visual Arts & Design
vam.ac.uk – Victoria & Albert Museum
Verre-Histoire.org
vintagegarage.co.uk – on petrol pump globes
WorcestershireRegiment.com – Data on Sire Hugh's regiment
wordsense.eu – disambiguation and origin of archaic terms, e.g. "coal brass"

PUBLICATIONS, GENERAL

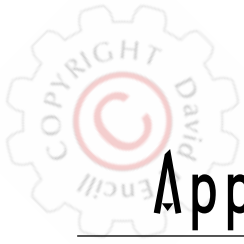
[author(s); title; date; publisher]

Abbink-Spauk, J. H.; Hampton, W. M.; Hockley, H. R.; Traffic Control by Light Signals; 1932; Chance Brothers
 Armstrong, Isobel; Victorian Glassworlds; 2008; Oxford University Press
 Ayto, John & Crofton, Ian; Brewer's Britain and Ireland; Weidenfeld & Nicholson
 Bailey, Rita; Chance Brothers: The French Connection; 2018; Smethwick Heritage Centre
 Barker, T. C.; Glassmakers, The; 1976; Weidenfeld & Nicolson
 Barker, T. C.; Pilkington: An Age of Glass; 1994; Boxtree
 Beaumont, F. W. G. & Hallett, L. B. H.; Austinlite Automatic Standby Plant; c.1930; Austinlite Ltd
 Beaver, Patrick; Crystal Palace, The; 1970; Phillimore & Co. Ltd
 Brock, William Hodson; William Crookes (1832–1919) and the commercialization of science; 2008; Ashgate
 Brunton, Richard Henry; Building Japan: 1868–1876; 1991; Routledge
 Buckley, Francis; Old English Glass Houses (specifically the chapter on Birmingham Glass Trade: 1740–1833); 1927, republished 2006; Society of Glass Technology
 Cable, Michael (translated); Bontemps on Glassmaking; 2008; Society of Glass Technology
 Caddick, James H.; Hildred, Trevor; Red Bricks by the Pool, The; self-published
 Chance Brothers; Mirror for Chance; 1951; Chance Brothers' private publication
 Chance, James Frederick; Chance of Bromsgrove and of Birmingham; 1892; Witherby & Co.
 Chance, James Frederick; History of the Firm of Chance Brothers & Co. Glass and Alkali Manufacturers, A; 1919; reprint 1926; Spottiswoode, Ballantyne & Co. Ltd, London
 Chance, Sir Hugh; Notes on the History of Chance Brothers Limited: 1920–1975; 1975 (unpublished manuscript)
 Chinn, Carl & Dick, Malcolm; 2016; Birmingham, The Workshop of the World; Liverpool University Press
 Cohen, Ruth & Cook, P. Lesley; Effects of Mergers; 1958; George Allen & Unwin Ltd
 Court, W.H.B.; Rise of the Midland Industries, 1600–1838; 1938 (reprinted 1953); Oxford University Press.
 Dent, Robert K.; Old and New Birmingham: A history of the town and its People; 1880; Houghton & Hammond
 Dewar, George A. B.; Great munition feat, 1914–1918, The; 1921; Constable
 Dingley, Cyril S.; Story of B.I.P. (1894–1962), The; 1963; pub. British Industrial Plastics Ltd
 Dodd, George; The curiosities of industry and the applied sciences; 1853; George Routledge & Co.
 Douglas, R. W.; Frank, Susan; A History of Glassmaking; 1972; G T Foulis & Co. Ltd
 Ellis, Jason; Glassmakers of Stourbridge & Dudley, 1612–2002; 2002; self-published
 Encill, David P.; Chance Expressions: The History of Domestic Glassware from Chance Brothers; 2007; Cortex Design
 Encill, David P.; Chance Additions: A Sequel to Chance Expressions; 2014; Cortex Design
 Fabry, Ch.; Zeeman P.; de Broglie, L; Centenaire d'Augustin Fresnel; 1927

- Frost, A. C.; McGrath, Raymond; *Glass in Architecture and Design*; 1937; Architectural Press
- Garland, Rosemary; *Glass*; 1952; Educational Supply Association Ltd
- Goodwill, Philip & Gauge, Mike; *A History of Chance-Pilkington: 50 Years of Glassmaking in St Asaph*
- Hadjamach, Charles R.; *British Glass 1800–1914*; 1991; Antique Collectors' Club
- Hadjamach, Charles R.; *20th Century British Glass*; 2009; Antique Collectors' Club
- Holway, Tatiana; *The Flower of Empire*; 2013; Oxford University Press
- Home Dickson, J.; *Glass: A Handbook for Students and Technicians*, M.Sc. (ed.); 1951; Hutchinson
- Howard, Joseph Jackson (ed); Crisp, Frederick Arthur (ed); *Visitation of England and Wales*; 1895; private publication
- Jackson, Lesley; *20th Century Factory Glass*; 2000; Octopus Publishing Group
- Jackson, Myles W; *Spectrum of belief: Joseph von Fraunhofer and the craft of precision optics*; 2000; MIT Press
- Lane, Tony; Roberts, Kenneth; *Strike at Pilkingtons*; 1971; Fontana
- Martin, Harold; *Notes on the Production of Cathode Ray Bulbs at Chance Brothers Ltd*; 1944; unpublished
- Martin, Harold; *A Short History of the Globe Department*; 1947; unpublished
- Matsumura, Takao; *Labour Aristocracy Revisited, The; The Victorian Flint Glassmakers 1850–80*; 1983 (revision of thesis, Warwick University, 1976); Manchester University Press
- Mellor, D. P.; *The Role of Science and Industry*; 1958; Australian War Memorial
- Moore, N. Hudson; *Old Glass: European and American*; 1924; Tudor Publishing Co.
- Neri, Antonio; *Most Famous Glassmaking*; translated by Merrett, Christopher; edited by Cable, Michael; 2006; Society of Glass Technology
- Newman, Harold; *Illustrated Dictionary of Glass, An*; 1977; Thames & Hudson (a very underestimated book)
- Phillips, Janet and Peter; *Victorians at Home and Away*; 1978; Croom Helm Ltd
- Pilkington Brothers; *Dictionary of Glass Names*; c.1974; Pilkington
- Pilkington Brothers; *Now Thus—Now Thus*; 1926; Pilkington
- Pilkington Brothers; *Progress in Glass*; 1951; Pilkington
- Pilkington Brothers; *Souvenir of Visit of their Majesties The King and Queen*; 1913; Pilkington
- Pilkington, David; *A Glass Act*; 2010; self published
- Pilkington, Roger; *Glass*; 1965; Oliver & Boyd Ltd
- Powell, Harry J.; Chance, Henry; Harris, H. G.; *The Principles of Glassmaking*; 1883; George Bell & Sons
- Prosser, Richard B.; *Birmingham Inventors and Inventions*; H.M. Patent Office; 1881; republished 1970; S.R. Publishers Ltd
- Rosenhain, Walter; *Glass Manufacture*; 1908; D. van Nostrand
- Rush, James; *The Ingenious Beilbys*; 1973; Barrie & Jenkins
- Sauzay, Alexandre; *La Verrerie*; 1867; L. Hatchette et Cie, Paris
- Sauzay, Alexandre; *Marvels of Glass-Making in all Ages*; 1870; Sampson Low, Son, and Marston
- Smith, Andrew F.; *Nailsea Glassworks, The*; 2004; Avon Archaeological Unit
- Smithells, Roger; *Glass In Your Home*; c.1955; Pilkington
- Sadar, John Stanislav; *Through the Healing Glass*; 2016; Routledge
- Sherard, Robert Harborough; ill. Piffard, Harold; *White Slaves of England, The*; 1897; James Bowden
- Thomas, Margaret; *Nailsea Glassworks, The*; 1987; self-published
- Thomason Billie-Gina A.; *Not every Man was Male*; 2020; PhD thesis Liverpool John Moores University
- Thorpe, W. A.; *English Glass*, 2nd ed.; 1949; Adam & Charles Black
- Timmins, Samuel (ed); *Birmingham & the Midland Hardware District*; 1866; Robert Hardwicke; Reprinted 1967, Frank Cass & Co. Ltd
- Times, The (compiled by); *British War Production 1939–1945*; 1945; Printing House Square
- Turner, Barry; *Beacon for Change: How the 1951 Festival of Britain shaped the modern age*; 2011; Aurum Press Ltd
- unknown; *Manufacture of Optical Glass and of Optical Systems: a War-time Problem, The*; Ordnance Department USA; 1921; US Government Printing Office
- unknown; *Centenaire d'Augustin Fresnel* various; *England's Workshops*; 1864; Groombridge & Sons various; *Reports of the Juries from the International Exhibition of 1851*; 1852
- Vincent, Keith; *Nailsea Glass*; 1975; David & Charles Ltd
- Williams, Mari E. W.; *Precision Makers, The*; 1994; Routledge
- Winter, J. M. (ed); *War and Economic Development: Essays in memory of David Joslin*; 1975; Cambridge University Press

PUBLICATIONS, LIGHTHOUSES

- Bowen, John Poland; *British Lighthouses*; 1947; The British Council
- Chance, Toby & Williams, Peter; *Lighthouses: The Race to Illuminate the World*; 2008; New Holland Publishers
- Garland, Rosemary; *Lighthouses*; 1958; Educational Supply Association Ltd
- Grant, R. G.; *Lighthouse: An Illuminating History of the World's Coastal Sentinels*; 2018; Black Dog & Leventhal
- Grant R. G.; *Sentinels of the Sea: A Miscellany of Lighthouses Past*; 2018; Thames & Hudson
- Hague, Douglas B.; *Lighthouses of Wales*; 1994; Royal Commission on the Ancient & Historical Monuments of Wales
- Ibbotson, John; *Lighthouses of Australia: Images from the end of an Era*; 2001; Australian Lighthouse Traders
- Ibbotson, John; *Lighthouses of Australia: The Offshore Lights*; 2006; Australian Lighthouse Traders
- Jackson, Brendan; Broadway, Geoff; *Keepers of the Light: Portland Bill and Chance Glassworks*; 2019; private
- Levitt, Theresa; *A short, bright flash: Augustin Fresnel and the birth of the modern lighthouse*; 2013; W. W. Norton & Co.
- Nancollas, Tom; *Seashaken Houses*; 2018; Penguin Random House
- Sutton-Jones, Kenneth; *Pharos: The Lighthouse Yesterday, Today and Tomorrow*; 1985; Michael Russell Publishing Ltd
- Talbot, Frederick A.; *Lightships and Lighthouses*; 1913; William Heinemann



Appendix

1 Lucas Chance's Notes

INSTRUCTIONS TO HIS SON, JOHN HOMER CHANCE

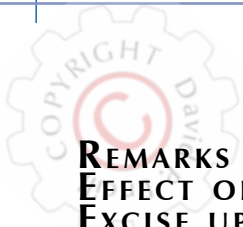
The 39-point instructions from Lucas Chance to his son John Homer Chance, on the latter first going to the Works in 1850.

Memo for J. H. C. relative to the management of the Sheet Glass Manufactory

July 2, 1850

1. The first thing is to ascertain the substances and sizes required for plate.
2. The second do. do. for orders.
3. Then to watch every journey that the managers of each house understand exactly what size and substance each man is to make.
4. To enable you to make every kind at the lowest rate of wages, you must make yourself acquainted with the different tariffs at which each man works, and know therefore what kind to appropriate to each man.
5. At the end of every journey ascertain the quantities made by each, and if any man makes less than his proper quantity enquire why and wherefore, and if it proceeds from idleness or neglect have him before you, and if necessary before me or J. T. C. Pass over no case of neglect, and visit the defendant at his house rather than not know the cause of absence. Give no heed to pleas of sickness without the strictest enquiry.
6. It often happens that the shade blowers are obliged to make cylinders because their gatherers are absent, or from the want of proper previous arrangement. The same with the colour'd and flash'd glass. I have to-day given written instructions to Mr. Bontemps that we hold him responsible for proper arrangements for shades and flash'd and colour'd glass. But don't depend on this; see that no case of neglect occurs, so that the managers will all know that you are aware of all the losses arising from bad arrangements.
7. Look at the journals of each manager daily, and any defect you see, that does not appear in their journal, you will add, or else keep a journal of your own to register every thing that goes wrong.
8. We lose immensely by metal being made and not work'd out, owing to the non-attention of workmen or [their] being absent, or idle, or blowers lacking gatherers, and gatherers lacking blowers, from a want of rigid discipline; and this is an especial evil now we are short of men.
9. There is the greatest difficulty in getting 13 oz. made, and even 16 oz., because they get more wages in making 21 and 26 oz. You must insist on the coarse glass being made into 13 oz., and no inferior workmen should on any account make any substance beyond 16 oz., because all the breakage of 21 oz. and upwards is a most serious burden and a very great loss, indeed we don't know what to do with it.
10. To encrease the quantity of 16 oz. of good, and 13 oz. of the coarse, is of primary importance, which will have the double effect of encreasing the quantity of saleable, and of diminishing the unsaleable glass made.
11. You must have before you at all times the quantities required of each kind for orders generally, and for especial orders. At the present moment we want an encreased quantity for plate, that we may work night and day, of which a large portion should be 16 oz. I think a certain quantity of 32 oz. is also required, but Cashmore can tell you best.
12. The large sizes for New York, Boston and Philadelphia must have your especial attention. Aim at one order at a time. Finish off the absolute orders, Schrack's and Lamon's, &c., and for consignments prepare Henry Holland's in preference to any other.
13. Watch the quality of the metal, and have reports and samples of the colour in each house daily, and should there be any bad founding, or stones in many of the pots, or broken pots, or inferior colour, take care I know it, or J. T. C. in my absence, and especially have the founder before you, that he may not repeat the same thing over and over again.
14. Broken pots are the worst of all evils, and a report of every case should be instantly laid before me or J. T. C., and don't rely on that, but tell me also.
15. Many of my remarks are equally applicable to each manager, and you will therefore make such abstracts for them as you think necessary.
16. There are three or four men engaged at £3 per week as blowers, and 30s. per week as gatherers. Whenever we can dispense with them as blowers they must be employ'd as gatherers, viz. Tho^s. Thompson, Tho^s. Oakes, and Parish. They are bound as gatherers at 30s. per week without limitation of hours.
17. Zellar, the shade maker, must always be employ'd at shades, as he is bound at a high tariff as blower.
18. To have good shade metal every day is of primary importance, and there fore a first rate founder should always be in the shade furnace.

19. No. 3 is so much farther from the shade arch than No. 2 that I doubt the expediency of making shades there. Ascertain the loss of quantity made thereby, and any other evil that may appear to arise from this extra distance, and make a special report on this point.
 20. It is said that the metal in the small pots in No. 3 is not habitually so good as in No. 2, and the metal in No. 2 not so good as in the 8-pot furnaces. These are points to be carefully ascertain'd.
 21. At present, the colour is not so good in No. 2 and No. 3 as in Nos. 5 and 6. You must endeavour to learn why and wherefore.
 22. It will be an important part of your duty to see that the workmanship of each man is good, and therefore you will make yourself thoroughly acquainted with what constitutes good work, for which purpose you must visit the warehouse daily and examine every man's work for yourself, and report to each manager the defects of each workman.
 23. The defect which is of primary importance is breakage, because it converts a saleable into an unsaleable article. Take every possible pains to diminish this in blowing, in cutting in the cylinder room, in carrying, in the cutting, and in the packing.
 24. The next defect is scarcely of less importance, that of having the sheets of equal substance throughout the sheet, without which it will not do for plate.
 25. The 3rd defect is blisters, which also diminishes vastly the quantity which will do for plate.
 26. Don't forget to note when the metal is seedy, as that prevents the metal being at all fit for plate glass.
 27. The flattening is now under Mr. Sam^l Withers's management, and all defects in that department you will report to him as well as to me. You will have to learn to distinguish between the bad flattening proceeding from bad work in the blowing, and that from over-firing, not rubbing down, &c. &c., by the flattener. A great deal of good glass is spoil'd by the flatteners.
 28. As we have plenty of flatteners, no bad flattener should be employ'd, and if any of the engaged men are inferior flatteners we must get rid of their engagements by purchase or otherwise.
 29. At St. Helen's and Sunderland they don't pay the flatteners for bad work, and we must adopt the same plan as soon as we can.
 30. Treat the managers with great respect, go hand in hand with them, don't send for the men without consulting them and do everything in your power to support their authority.
 31. As Robert took this department for some time, I recommend you to copy my remarks and send them to him, that you may have his corrections and additions.
 32. You must pay special attention to the having all the men to whom we guarantee a certain payment per calendar month fully employ'd and you must notice especially whenever they don't make the full quantities each day from their own default, from absence, from being unwell, or any other cause. You must take especial care that gatherers are provided for them whenever their own gatherer is absent.
 33. Be especially watchful to provide additional gatherers for Mondays, as the men are very apt to be absent Monday mornings. It is especially the business of each manager to provide for these contingencies, but it will be your place to enquire whether they are fully prepared.
 34. Above all, let no man absent himself, or neglect his work, from the highest to the lowest, without reporting it in your journal, and without endeavouring to prevent a repetition of it.
 35. I have omitted to say anything as to the patent plate works, but it will be quite necessary that you are in constant communication with the heads of the respective departments with reference to a full supply of glass.
 - a) Lawton for the proper quantities going to be flatten'd.
 - b) Wm. Cutler and Holloway do. do.
 - c) Jordan do. do.
 - d) Sam^l. Withers, to ascertain that he gets an abundant supply to be reflaten'd.
 - e) Rigby, do., to be ground, of each kind necessary.
 - f) Wm. Shirley, do., smooth'd.
 - g) Jno. Shirley, do., to be polish'd.
 - h) Jos. Gittins, do., for his orders.
 36. Colour'd department. Ascertain the quantities made by each man and the quality, and have the whole measured by Solomon Cutler jun' and reported each week, and go into the colour'd room constantly.
 37. Stain'd. Do. do. Hawkins measures this up.
 38. Leguay. See him constantly and report how he gets on, he and his son.
 39. Ornamental dept. Go there constantly with the object of ascertaining that each party employ'd is fully occupied.
- Observations:**
Do. signifies "ditto"; that is, the same as stated above.
J. T. C. is James Timmins Chance
£3 per week is equivalent to £319.63 in 2023
Tho^s. is Thomas; **Sam^l.** is Samuel; **Wm.** is William; **Jno.** is John; **Jos.** is Joshua
Zellar was a French blower. Making shades was exclusive work for the top sheet glass workers
Robert is Robert Lucas Chance Jnr., John's elder brother and Lucas' son



REMARKS AS TO THE EFFECT OF TAKING OFF THE EXCISE UPON GLASS

By Lucas Chance, January 24, 1860

I have known more or less of the manufacture of Crown Glass since 1801.

1. At this time and until the abolition of charging by the Gauge the frauds on the revenue were enormous. The drawbacks on the Exportation were usually so regulated that the exported obtain'd a great deal more than the Duty actually paid. In many cases the bonus went, not into the pockets of manufacturers, but of the chief dealers.

I expect these remarks apply equally to Plate, Flint and Broad Glass. One Plate Glass manufacturer told me that they had realized Fifty to Seventy thousand pounds by exporting German sheet at 2s. 9d. p. foot drawback, the duty being not more than 9d., without any infringement of the Act of Parliament regulating the duties and drawbacks on Plate Glass. This led to the limitation of thickness to $\frac{1}{8}$ th of an inch and upwards.

2. When Mr Wood became Chairman of the Board of Excise a great change took place in the intercourse between the Board and the manufacturers—previously the manufacturers rarely saw the Board or the Chairman but the Solicitors to the Excise, and so long as Mr Vivian was the solicitor the manufacturers were treated as so many persons whose business it was to defraud the Revenue. Mr Wood took immediate steps to make the acquaintance of the manufacturers with a view to ascertain who paid the Excise Duty in full and who did not—from the former he sought to obtain information and before the tax was taken off Glass in 1845 the frauds on the Revenue had been greatly reduced. Probably the net revenue of the Excise duty on Glass, as long as it was charged by gauge, was not more than one-half that would have been netted had the drawbacks been properly regulated and the full duty been paid by each manufacturer. After the duty was paid from the mouth of the kiln probably three 4ths of the net duty was paid into the Exchequer, but to the last I have reason to think that by more than one house a large portion of their income was derived from frauds on the revenue. The effect of these frauds was to interfere with the regular course of trade, and deeply to injure those who paid the Crown all that was due.*

3. Another pernicious effect of the Excise Duty was that of causing the manufacturers to make their glass as thin as possible, and since the duty has been removed the ordinary Crown Glass has been

increased in substance from 40 to 50 per cent, and Sheet Glass is on the average probably encreased as much.

4. It is very difficult to say what the encreased quantity in measurement has been made in Great Britain since the duty came off. Before then none, or next to none was imported. We had a monopoly of the Home market and of some of the Colonies, but the quantity consumed in Great Britain is probably encreased fivefold, of which probably one third or one fourth is imported at about 20 per cent, below what we can sell it for here.
5. The manufacturers of Great Britain, however, make a good deal of heavier Glass than they could make before owing to the smaller cost, and probably they make five times the Weight that they made before 1845.
6. No Sheet Glass was manufactured in Great Britain until it was made at our Works by the importation of a body of Workmen in 1832 from France and Belgium, and it is well that we did then commence and teach a considerable body of workmen, for even now we have not been able to teach a sufficient body of workmen to enable us to dispense with foreign workmen. Hence we have to pay higher wages than those paid in France and Belgium, which with other advantages they have in materials and costs enables the manufacturers of those two countries to export Sheet Glass to London and all the ports of this country and all over the world, of better colour and at lower prices than the manufacturers of Great Britain.
7. Whilst our glass is prohibited in France and charged with a high duty in Belgium foreign Glass comes into this country duty free—but I hope this will shortly be remedied, for although the foreign ordinary glass is of better colour than ours, yet the surface of our glass being better we beat the foreigners in the real quality and import the French sand to make the higher qualities.
8. The best proof that great frauds were made by manufacturers before 1845 is that the number of manufacturers is diminish'd one half.

R. L. C.

* The Spon Lane firm was of the latter class. A Board minute of 26th March 1834, runs: "Mr Chance having reported that Mr Dehany told him he had no intention of altering the drawback on sheet glass, it was resolved that it is expedient to keep back at all times such a quantity of sheet glass as to prevent the drawbacks exceeding the duty paid, until such a home trade can be established as will remove the difficulty."

Appendix 2 Finances, 1823–1829



The value of the Freehold and Stock showed an approximate increase of 42% and 46% respectively over the first four years of business.

	1823	1827
Freehold	15,187	21,519
Stock	8,568	12,478

By 1829, the Balance Sheet reads as follows:⁸

CREDIT

Bills payable – Lubbocks, Mastermans.....	93,398	7s	3d
Debts owing by R. L. C.†	56,112	17s	11d
Bad debt sinking fund			
Commission a/c	}	18,312	13s 3d
Merchandise			
Contingency			
R. L. C.‡	49,474	4s	8d
TOTAL.....	£217,295	3s	1d

DEBIT

Cash	7,088	4s	2d
Chance & Hartley for bills paid	41,505	11s	7d
B.C.G.C. Freehold (£22,244)	}	54,792	13s 8d
B.C.G.C. Stock a/c (£23,869)			
Chance & Hartley Stock a/c (£8,679)			
Debts due to R. L. C.	109,161	4s	5d
Canal & Joint Stock property	11,606	15s	11d
Merchandise in stock, expenses of trade			
stock, stamps	77	1s	6d
Interest a/c, balance on this a/c	154	16s	0d
TOTAL.....	£217,295	3s	1d
			[£18.88 mn]

† This figure includes loans of £19,640 12s 1d [*£1.7 mn*] deriving from Henry Chance (£3,435); the executors of his father's will, William (IV, £5,765); the Trustees of William Homer (£2,870); and Joseph Stock (£7,569).

‡ This amount is later designated as "R. L. C. on ledgers at St Paul's Wharf". Added to this is £3,000 [*£260,668*], which represents the lease of the houses at Gower Street and Highgate, along with 'furniture, linen, plate books, wine, etc.'⁹

What may have appeared to be a successful venture from the outside, belied the fact that, in Sir Hugh's words, 'R. L. C.'s liquid resources were seriously stressed!'¹⁰

Lucas's own personal accounts are tied in with the Company's accounts, which do not properly show his personal status.

Owed

.....	56,112
.....	49,474
Total.....	105,586

Due

Total..... 109,161

Leaving Lucas with a balance of +£3,575 [*£325,000*]



Appendix 3 Credits

WITH SPECIAL THANKS TO ...

The late Sir Jeremy Chance, Bt., for his support. My thanks are also extended to other members of the Chance family who aided my work on Chance Reflections, in particular, Sir Sebastian, Bt., Tom, Giles, Toby, Henry Chance and Mary Iles.

The late Prof Michael Cable, for his invaluable insight into Georges Bontemps

Tony Cartwright, former General Manager, Fiesta Department, later Director of Fiesta Glass Ltd
Ray Drury, the last Chief Engineer at Chance Brothers
Bill Nicholls

The late Alan Taylor, formerly of the drawing office

In particular, Dr Malcom Dick, OBE, deserves special mention for agreeing to peer-review this book. Having this second pair of eyes to cross-check my work ~~would make~~ made such a difference to the final version.

CAN YOU CREDIT IT?

If you search on the internet for the term "why glass is called glass" you may stumble across the following most unhelpful FAQ: *'Glass was originally made up of glass and thus called glass'.*

FAQ

Why Glass Is Called Glass

There actually are simple Whatever a new product is invented or come to market, it would be named by the inventor or original owner. Glass was originally made up of glass and thus called 'glass' and later development lead it to made up of other substances of less cost.

In the Middle Ages it was referred to as glazen, from Old English glæsen. Going back further, from Proto-Germanic the term glasam is found, and probably the derivative for the English word. Finally, from the 1st century BC, when Roman glassmaking was at its height, the Latin term was glesum.

DR JOHNSON'S QUOTE IN FULL

The block quote from Section 1, Chapter 1 was préciséd from the original, which is as follows:

Who when he first saw the sand and ashes by a casual intenseness of heat melted into a metalline form, rugged with excrescences and clouded with impurities, would have imagined that in this shapeless lump lay concealed so many conveniences of life as would, in time, constitute a great part of the happiness of the world. Yet by some such fortuitous liquifaction was mankind taught to procure a body at once in a high degree solid and transparent; which might admit the light of the sun, and exclude the violence of the wind; which might extend the sight of the philosopher to new ranges of existence, and charm him at one time with the unbounded extent of material creation, and at another with the endless subordination of animal life; and, what is of yet more importance, might supply the decays of nature, and succour old age with subsidiary sight. Thus was the first artificer in glass employed, though without his knowledge or expectation. He was facilitating and prolonging the enjoyment of light, enlarging the avenues of science, and conferring the highest and most lasting pleasures; he was enabling the student to contemplate nature, and the beauty to behold herself.



1772, Samuel Johnson,
by Joshua Reynolds

Acknowledgements



Rita Bailey, for photographing the Board Minutes
Anne Bennett, for providing samples of early rolled-plate textures
The former Broadfield House Glass Museum, in particular Roger Dodsworth, Karie Moodie and the late John Smith, for providing access to its archives and glass archive at Himley Hall
Professor Michael Cable, for advice on Georges Bontemps
Cadbury Research Library for access to the Chance family personal papers
Chance Heritage Trust for access to its archives
Professor Carl Chinn, MBE, for his expertise and help with local knowledge
Patricia Coccoris, my soul-mate and partner, who sees things when I am blind
Mark Davies, Chairman of the Chance Heritage Trust
Richard Dean of Cartographics
Dr Malcolm Dick, OBE, for agreeing to peer-review this book, and his expertise and help with local knowledge
Peter Farley and members of his family who clocked up about 300 years' service in total.
Denis Hebden, for providing invaluable advice and assistance regarding image editing and photography.
Roger Lea, for information on Stone-Chance Ltd
Paul Lines, for kindly supplying digital images of early maps.
Madoc Books for kindly supplying photos from the 1862 book of stained-glass cartoons by Chance Brothers
Nita Newman for the Works plan, denoting the various buildings

Doris Parsonage (wife of Denis) and daughter, Wendy Smith, for access to their Orlak collection.
Brian Quirk, Chief Engineer at the Rolled Plate division at Pilkington, for spending invaluable time giving an excellent guided tour of the plant
John Raymond, for information and images concerning his father, former MD at Chance Brothers until 1954, John Raymond Snr
Tim Richards, a relative of the family that owned W E Chance & Co. Ltd and who, coincidentally, lives at Stanton Wick, the site of Nailsea's first glasshouse
Sandwell Archives, including Sarah Chubb (former senior archivist at Sandwell Metropolitan Borough Library), Ian Grey (former senior archivist) and members of staff, for providing access to the Chance archives, which had almost reached legendary status. Also, to Laura Brett for her invaluable and comprehensive work in archiving much of the material
Smethwick Heritage Centre Trust, including the late David Bryant, MBE, Chris Sutton and Peter Allen
Chris Stewart (author of *Davidson Glass, a history*) for kindly supplying scans from a Chance lighting catalogue, and supplying pertinent advice on Davidson Holophane products
Stuart Summers, whose knowledge on Chance domestic glassware sometimes exceeds my own and his knowledge of chemistry certainly helped clarify many matters
Thomas Tag of the United States Lighthouse Society for sharing images from his extensive collection
University of Birmingham

E&OE

To write this book I needed to be an Accountant, Chemist, Economist, Engineer (in many guises), Mathematician, Optician, Politician, Scientist (in many guises), Solicitor.

As I can only subscribe to one of those professions, inevitably the odd misunderstanding may arise. E&OE.

Chance Reflections

Volume 1: c.1500–1836

The History, Glass, and Technologies of Chance Brothers & Associated Companies

The company of Chance Brothers made an impact on Victorian England that can never be underestimated.

Originally starting as a manufacturer of ordinary window glass, Chance Brothers developed the manufacture of crown glass, and then sheet glass, while constantly improving the clarity of the glass.

After a very contentious two-year period in partnership with the Hartley Brothers, the Company emerged to forge ahead with new furnaces being built to further increase production, cementing its status as the leading glass producer in the Victorian era.

This is the first volume of ten. Further volumes will detail the history of Chance Brothers and the technologies it employed from 1822 to 1981.

Although often missing from monographs of company histories are detailed accounts of the reminiscences of its workers, this work includes those stories that would otherwise be lost.

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